

The IRON AGE

Vol. 159, No. 12

March 20, 1947

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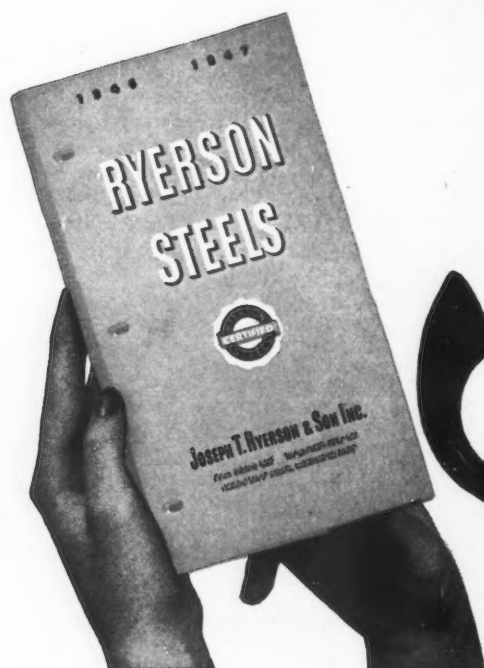


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Oh, Henry!

AMERICANS, man and boy, have vocal pride in their mechanical ability, their intuitive mastery of the machine. Of course, sometimes the truth will out. Most of them can't fix the confounded sweeper or replace a leaky water pipe—and anything electrical usually ends up in a blaze of sparks.

But, when it comes to automobiles, confidence still reigns supreme. There's no downing the natural desire to putter with the car. Let the Essex ping on a hill or start to grind or rattle, and out come the tools. It's usually good for a happy hour or so under the fender. It does something for the ego to correct the bad plug, set the points the way they ought to be or repair a leaky muffler, then to come triumphantly into the house waving greasy hands and loudly cussing those dopes in Detroit who hide bolts where no one can reach them.

All this seems to have been forgotten in Detroit.

After coddling the old crate for 10 years and learning to know every screw, bolt and wire through intimate contact, the new car now represents a frustrating challenge.

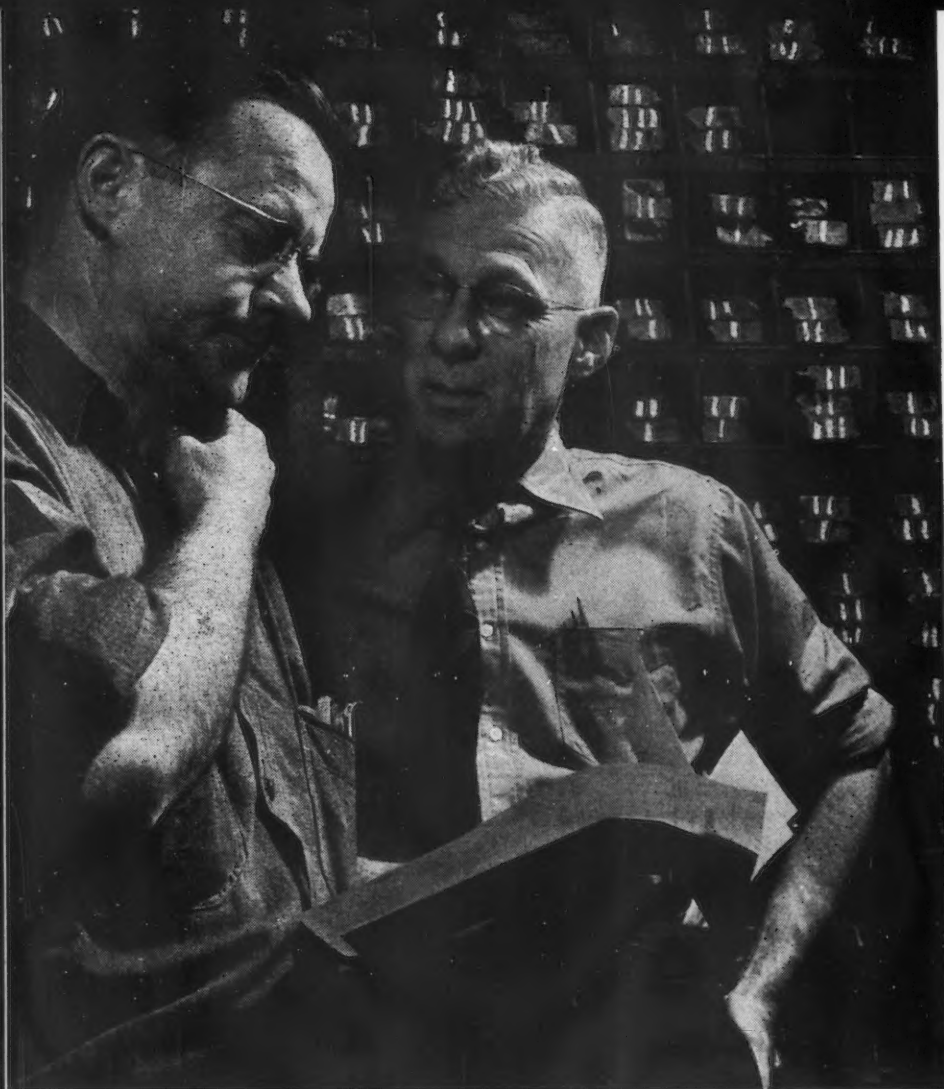
That new bus cost a small fortune, but look at 'er! Boy, is she sweet, and pick up?—Wow! Just to show her off and shine 'er up, makes life worthwhile again. Worthwhile, that is, until one opens the glove compartment and pulls out the alleged explanatory book.

What a measly pamphlet—an insult to any red-blooded, able-minded, American, poor, rich, young or old. Go ahead, take a look. Try and find a wiring diagram. From the book, it's hard to determine if the thing has any electrical system at all. What's the proper plug setting? Where are the fuses? Which of the gadgets on the carburetor control the air intake and where in hell are the screens? Of course, lubrication is given a good play—a squirt here, a shot there. But that's a job for a grease-monkey, not a suppressed mechanical genius.

The Detroit boys who write the "plugs" owe the owner something better than corny details such as "to start the car turn on the key."

The new owner is awfully disappointed, Henry. If the thing stops, where does he look? He used to know, or the book told him, and he read it through many times before the first oil change. He may eventually find out, but his pride has been hurt. Maybe the Detroit wizards think it's best that he shouldn't monkey around with the intricate innards. Maybe Detroit is afraid he might get some ideas. But it's his car, and damn it, he's got a right to know exactly what makes it tick and why!

D I Brown



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INLAND STEEL

March 18, 1947

- An Iron Age survey of major steel buyers indicates an immediate need for closer customer cultivation on the part of steel suppliers. It shows that when supply eases, 19.3 pct expect to change their source of supply while 17.5 pct are thinking about it. A breakdown of the reasons for changing shows 28.7 pct dissatisfied with service; 21.3 pct, prices; 32.5 pct, deliveries; 7.1 pct personal relations; and 10.4 pct quality.
- Aluminum nails are expected soon to become a major factor in the specialty nail business, competing strongly with stainless and nonferrous special use nails. There are now 10 nail producers in the field with others expected to come in. Using standard nail making equipment and already organized distribution channels these producers are expected to have a strong effect on the market soon.
- Despite recent alarming price rises in ferrous and non-ferrous metals a coming Dept. of Commerce study will show that, as of Feb. 15, the prices of metals were not badly out of line as compared with their relationship to the wholesale prices of all commodities over the past 25 years.
- The pump is the most widely used machine in the United States, according to a recent report by SKF Industries, which finds that the nation's 100 million pumps outnumber automobiles, telephones and refrigerators combined.
- The remains of the French fleet sunk at Toulon will be raised, yielding 200,000 tons of scrap for the Italian steel industry, most of which will go to Fiat at Turin.
- Recently certain aircraft manufacturers, in conjunction with Wright Field officials, have requested that x-ray acceptance and rejection standards be developed. The procedure is now being worked out for beryllium copper alloys, which are suitable for high temperature service at around 2000° F. Other ferrous and nonferrous x-ray standards will ultimately be developed.
- Production of the Volkswagen, the German "people's car," is being resumed after a halt in January due to the coal shortage. Coal allocations on hand are now sufficient for 3 months' output of the cars, which are now being sold to individuals in the occupying forces.
- A master tooling dock, using longitudinal, vertical and transverse straight-edges to locate any point in space without conventional measuring instruments, has been developed and put into use on the West Coast. It should be found useful in assembling large structures such as airplanes, trucks and railroad cars.
- Rumors of American steel interest in the Italian industry are again rife in Rome. But the new rumors—which include American money and raw materials with Italian labor and Mediterranean markets—may also include a generous amount of wishful thinking.
- Other reports from the Italian capital indicate that the wholesale transfer of Italian industry to Argentina is under discussion. Steel rolling mills, electrochemical works and others are rumored to be included. The deals would pay for shipments of raw materials from Argentina to Italy.
- A slackening of domestic demand for aluminum sheet coupled with a better supply picture has curtailed production to some extent and caused price to be a major sales factor. Further, a recent export embargo on aluminum roofing sheets has added to the confusion in domestic markets by increasing the available supply.
- GE and the Army have signed a contract to study artificial weather control. Large scale operations are in the dim and distant future but GE scientists do see possibilities of clearing up overcasts or making rain or snow wherever desired.
- Aluminum Ltd., of Canada, is considering a partnership with a Brazilian firm in Sao Paulo. Successful conclusion of the deal will mean construction of a Brazilian aluminum fabricating plant which sources there estimate will cost \$15 million. The Canadian company is expected to furnish some capital as well as engineering advice and some raw materials. Orders involving rolling mills have already been placed in the United States.
- Scrap shortage note: A New England contractor who had left his steam roller on one of his own lots at the close of the day returned next morning to find a couple of fellows with acetylene torches trying to cut it up for scrap "on orders from a junk dealer."

Automatic Resistance Welders

By ARTHUR M. UNGER
Chief Welding Engineer,
Pullman-Standard Car Mfg. Co.,
Chicago



FIG. 1—After welding, roof units are inspected and tested, and insulation and ventilating ducts installed. The entire section is then assembled into a smooth, modern Pullman representing the ultimate in railroad comfort, speed and safety.

WITH the advent of the streamline era, and with the significant technological changes that have come about in the industries which build railroad equipment, the romance of railroading, which seemed to be slipping in public affection during the past quarter-century, has come back stronger than ever.

In February 1934, America's first lightweight, streamline train, the City of Salina, glided out of the Chicago plant of Pullman-Standard Car Mfg. Co. The streamlining of that train was symbolic of the streamlining of production processes that has taken place since that time.

The development of new materials suitable for the construction of lightweight streamlined railroad cars created many problems, and the choice of carbuilding materials and processes used by Pullman-Standard came as the result of intensive investigation by their engineers and other research agencies. It was their conclusion that high tensile steel alloys, and the strong alloys of aluminum—together with the advantages of girder-type construction—offered the combination of qualities most suitable for the building of modern lightweight passenger train cars. Extensive testing and service use, and experience with severe forms of shock, have confirmed the soundness of these selections of basic carbuilding materials and designs.

To meet the demands of the railroads for safe, modern equipment and to secure full advantage of the materials now available to the carbuilder, Pullman-

Standard has carried on an intensive program of research in welding. It has been using welding in certain forms since 1915, but to combine lightweight with safety and a sleek surface, it became interested in the possibilities of resistance welding and the development of equipment to apply this technique to mass carbuilding.

Shortly after the war ended and the anticipated rush of orders for new streamline equipment came from the railroads, the company had ready the world's largest known resistance welding fixtures, so huge that they handle the entire side, or entire roof of an 85-ft railroad passenger car and are housed in a modern building more than 450,000 sq ft in area—the largest passenger car steel erection shop in the world.

In order to eliminate man-failures and to achieve precision, this equipment was designed to be as fully automatic as possible and was set up, under the direction of the welding engineering department, to minimize the effort required to produce high quality results.

Technically, there are three types of large resistance welders, with, of course, dozens of single spotwelding units as supplements. These are, briefly, (1) the roof welder, which is in two units, each capable of welding an entire car roof into one integral unit, the more than 8000 spotwelds which are required being completed in slightly more than 2 hr, or an average of one weld per second; (2) the side welding fixtures, in four units so arranged that two entire car sides can be welded at

Speed Railroad Car Construction . . .

Production of lightweight all-steel Pullman cars by the use of giant, highly automaticized resistance welding machines is described in this article. These welding units, among the world's largest, are capable of welding an entire car roof or two complete car sides at one time. One unit is capable of making more than 8000 spotwelds in slightly more than 2 hr to complete an entire car roof in one operation. The ingenious fixtures and photo-tube relay indexing systems used in these operations are also discussed herein.

once, completing the more than 7000 required welds in slightly over 3 hr, and (3) the multiple spotwelder, a single unit used in subassembly operations which will complete over 1400 spotwelds per min.

Roof Welders

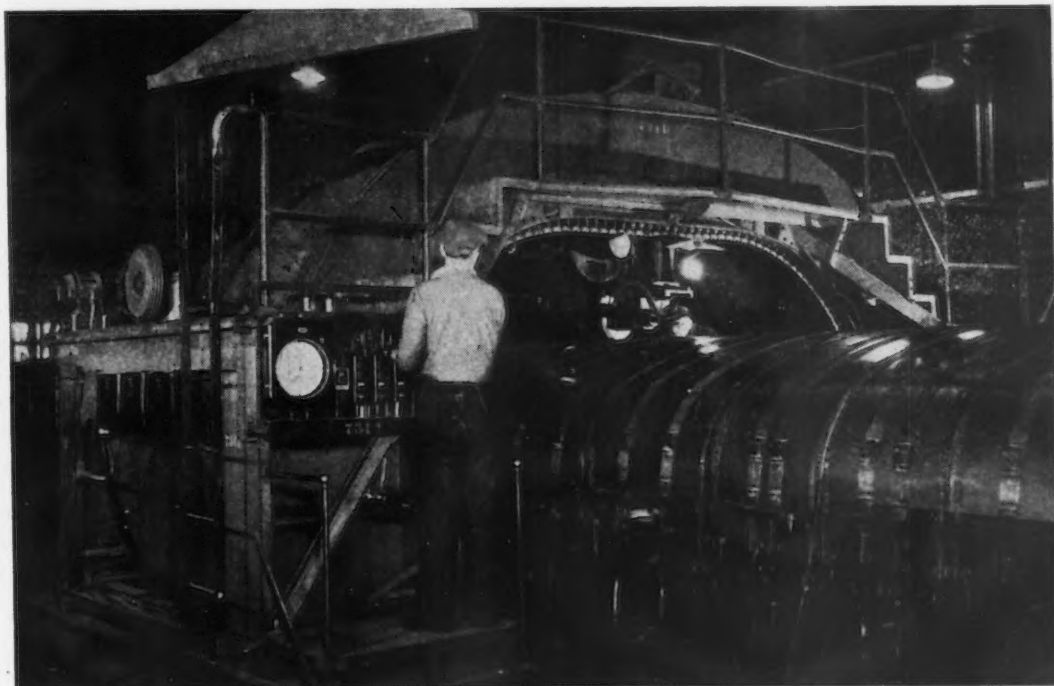
The roof welders are composed of the machine and jig shown in fig. 2. This welder has roller type electrodes mounted on a carriage that traverses the entire width of the roof jig. The track for the transverse movement across the roof is shaped to conform with the curvature of the roof so that welding pressure in all positions is normal to the roof. Two electrode rolls are used side by side, connected in series with the welding transformer so as to make two welds simultaneously, one on each of two sheets that butt together on the roof carline. The roof carline is supported by

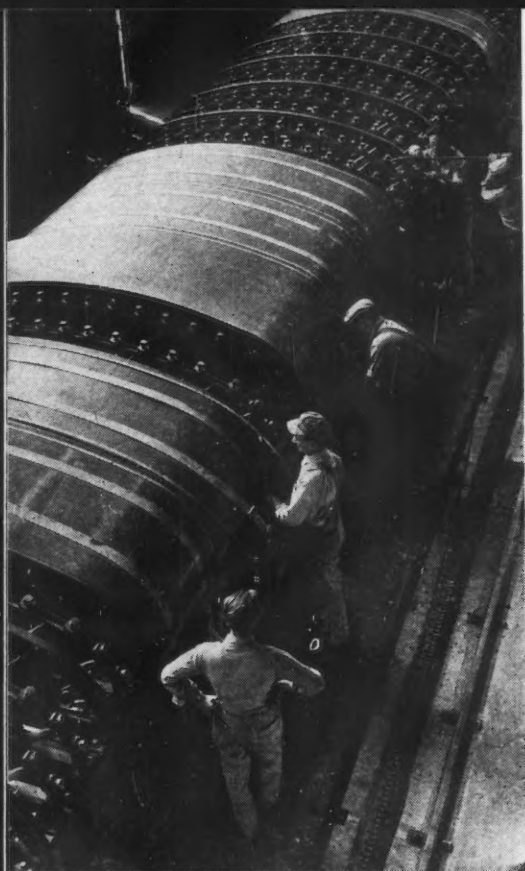
a copper backup bar, which in turn is supported by a steel structure capable of withstanding the pressure of the two welding rolls.

Fig. 3 is a view of the roof jig showing how a complete roof is fitted up at one time. The carlines or transverse supporting members of the roof are fitted over the copper backup supports. The electrode wheels roll from one end of the carline to the other, welding the sheets to the carline. The sheets, as the illustration shows, are laid transverse to the roof and are strapped firmly into position to insure that the correct contour is maintained during the welding operation. After each seam is welded the equipment holding the roller head is moved longitudinally to the next seam.

Movement of the welding rolls along the carline is controlled by a variable speed dc motor driving the welding unit. The welding rolls are idlers, their speed

FIG. 2—Capable of welding an entire railroad passenger car roof into one integral unit, this machine can produce 8000 spotwelds in slightly over 2 hr.





LEFT
FIG. 3—More than 170 ft long, the car roof welding fixture is a double unit so arranged that while one roof is being welded another is being fitted up. The welding machine runs along the track shown at right.

RIGHT
FIG. 4—Side sheets are built up from 16 separate prefabricated sections welded into a single unit with one horizontal and seven vertical seams by Unionmelt welding as shown here.

The corrugated stiffeners are spotwelded to these separate sections. When this operation is complete, the sections are joined together using the submerged arcwelding process. This is an interesting application of this method, welding together sheets of only 0.075-in. thickness with seams from 8 to 14 ft in length. The uniformity of the welding bead, rigid clamping and speed of the process result in joining of the sections into one sheet the full height and length of a car side without buckling. Fig. 4 illustrates the welding of one of these seams.

The side framing is made up of rolled Z sections and angles. These members are all fitted up on a full car length jig and arcwelded together. The jig and welding operation is illustrated in fig. 5. There are



being governed by the speed of the welding unit. This is a direct ratio only when the welding unit is running on a straight track and the welding rolls are on a straight line parallel to the track. The track, however, is not straight but curved, and the roof also has a varying curvature. In order to have constant welding speed at the electrode rolls, it is necessary to vary the speed of the driving motor. This is accomplished by obtaining power for the driving motor from a motor generator set. The voltage supplied to the driving motor is varied by means of a rheostat in series with the shunt field of the dc generator of the motor generator set. The rheostat is mounted on the welding unit and is operated by a cam track placed along the supporting track of the welding unit. By proper location of the cam track, it is possible to have constant speed at the welding rolls.

Change in Welding Speed

At certain positions on the roof, however, it is desirable to have a change in welding speed to compensate for the variation in contact area of the welding rolls to the work on those portions of the roof with different radii of curvature. The top of the roof has a much larger radius than the sides; therefore, more of the roof sheet is in contact with the electrode roll. It is necessary to speed up the welding roll on that portion of the roof, with the smaller radius in order to avoid overheating of the spotwelds due to the higher concentration of welding current. It has been found very practical to do so on this machine, thereby producing uniform welds.

After welding, the roofs are removed from the jig and set on supports as shown in fig. 1. In this position the welds are inspected, the inside of roof is painted and insulated, and air ducts and exhausts are installed.

Side sheets for the car are divided into sections by one horizontal seam and about seven vertical seams.

definite advantages in making the side sheet and side frame in separate units before they are joined together. All welding shrinkage takes place without affecting the side sheet. The frame is straightened after welding, insuring a smooth flat car side when the framing is spotwelded to the side sheet.

Fig. 6 shows the side sheet in place against the copper backup of the side spotwelding fixture. This copper back supports the entire car side and permits welding pressure to be applied at any point desired over the entire area. In this illustration the side framing is being lowered ready for assembly against the side sheet.

The side spotwelding machine, fig. 7, is an auto-

matic machine that has two welding electrodes that make a series weld. These electrodes, with the transformer unit that supplies the welding current and the air cylinders that supply the welding pressure, are indexed automatically in either a horizontal or vertical direction as desired by the operator. The welding unit is rotated 90° for welding horizontal members of the framing to the side sheets. When welding horizontal rows, the entire machine indexes along the track on which the machine is mounted. Indexing of the machine is accomplished by means of a motor which is started and stopped for each index. The length of time that the motor runs is governed by an electronic sequence panel and the spacing of the spots is controlled by turning a timing dial on the sequence panel. A plugging relay gives quick braking for the motor and accurate spacing. The motor is especially designed for frequent starting.

With this flexibility the spotwelding chart is worked out ahead of time and the controls set so that the operator needs merely to press a button and the

electrode machine has recently been installed to weld these subassemblies in large quantities. This machine is illustrated in fig. 8. This machine also utilizes the series welding principle. Two electrodes are in series, with the copper plate on the table top serving as a backup, underneath the work, to conduct the welding current. Each pair of electrodes has a separate welding transformer. Spacing between the electrodes is adjustable, and each electrode has individual pressure adjustment by means of springs.

All the electrodes are mounted on a ram, the vertical movement of which is toggle operated by means of hydraulic cylinders. Provision is made for a normal operating stroke and an additional retraction stroke to clear higher objects.

The main feature of this machine is its automatic operation in indexing and movement of the table. The table is made twice the length required for the work so that one end can be unloaded and loaded



LEFT
FIG. 5—Side frames are made up from Z sections and hand welded as shown. An entire side frame is made up on a special jig with provision made for shrinkage so that the finished unit will be to exact size.

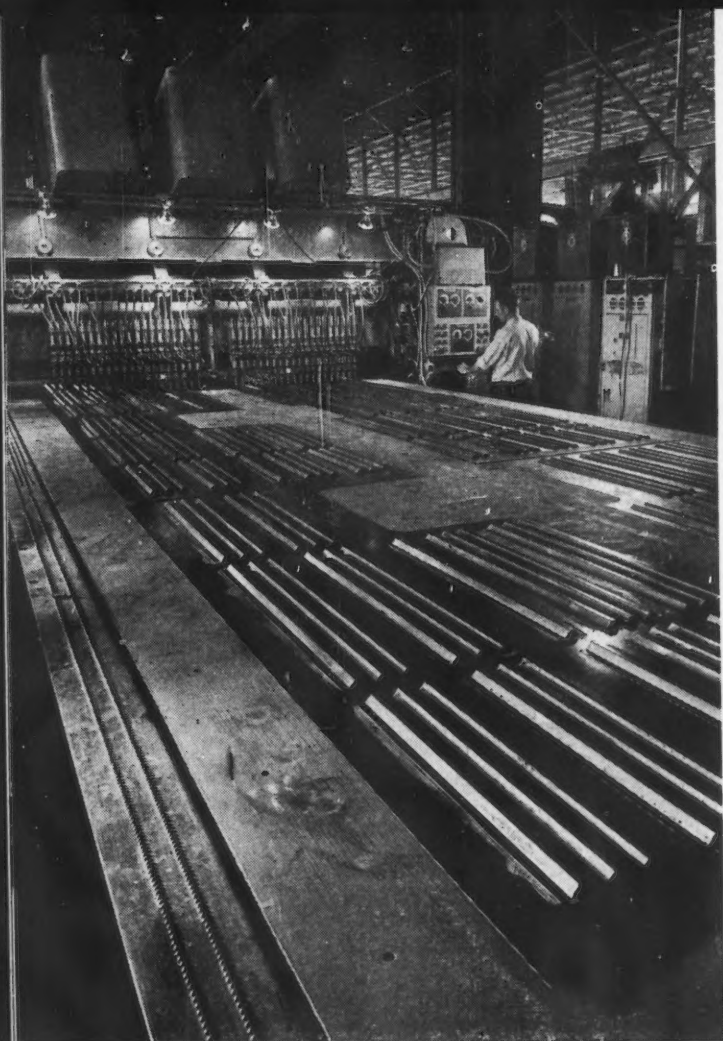
proper vertical or horizontal indexing movement takes place. The copper backup plate, which can be seen through the window cutouts in fig. 7, supports the pressure of the welding electrodes and also acts as a conductor of current between the two electrodes which make series welds.

Four of these units are so arranged that two sides can be welded at one time, while two others are being fitted and made ready. It requires slightly more than 3 hr to complete the required 7000 spotwelds.

Flat sides on lightweight railroad passenger cars are accomplished by the use of internal stiffeners spotwelded to the side sheets. The entire area of the side with the exception of clearances for attachment of framing members is covered with corrugated stiffeners. These stiffeners prevent any distortion or buckling of the side sheets. There is a considerable amount of spotwelding involved in the fastening of these stiffeners to the side sheets. A large multiple

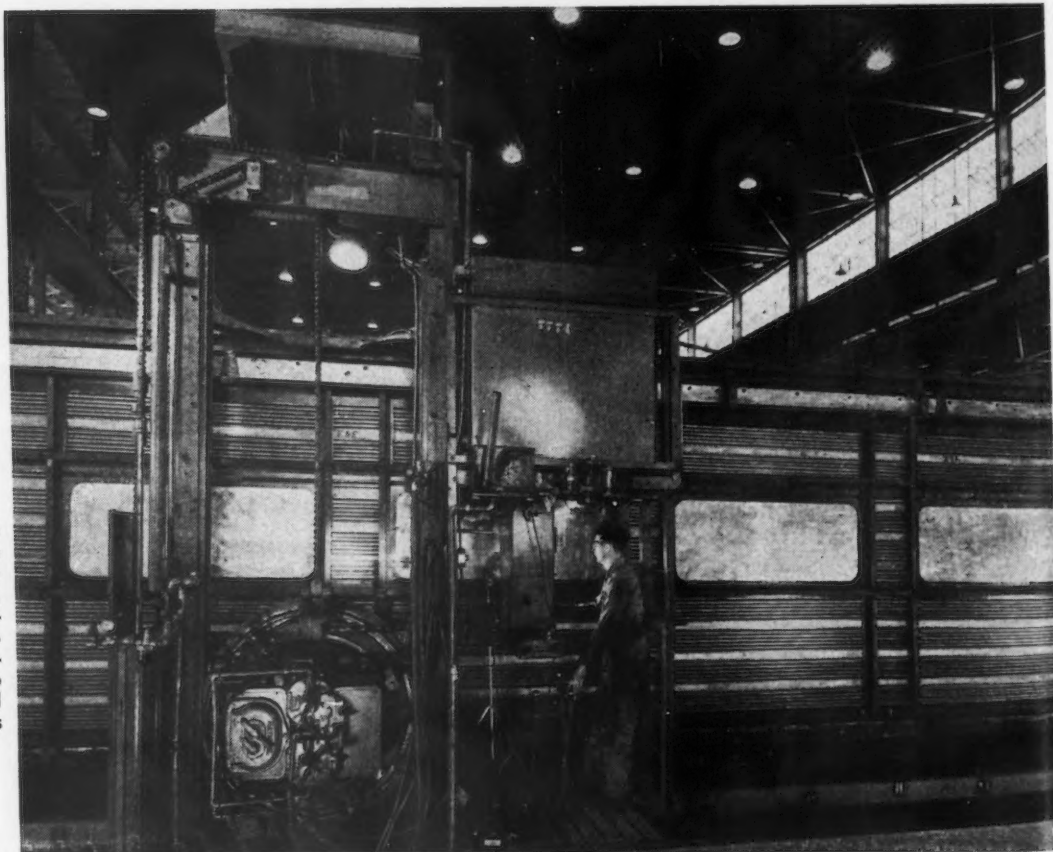
RIGHT
FIG. 6—Definite advantages have been found to accrue from building the side sheet and side frame in separate units. Here the sheet is clamped against a copper backup plate and a frame is being lowered into position for assembly welding.





ABOVE
FIG. 8—One of the world's largest multiple spotwelders is used for assembling corrugated stiffeners to car side sheets. It contains 48 electrodes and can produce 1400 spots per min. The moving table indexes automatically to each welding station.

RIGHT
FIG. 7—Side frame and side sheet are welded together by a double electrode, automatic spotwelding machine specially designed by Pullman Standard. The machine covers all surfaces and makes 7000 spots in 3 hr.



while welding is taking place on the other end. Indexing is accomplished by means of phototube relays. The light sources and phototubes are mounted near one side of the table so that an indexing pattern on the table will control them. Fig. 9 shows the indexing pattern being set up.

Two rows of holes full length of the table are placed in such a position as to pass between the phototube and light source. All holes are filled with loose rivets so that light cannot pass through. When a rivet is pulled out of a hole, it permits light to pass through, operating the phototube relay and welding in the position selected. Any pattern of welding desired can very easily be set up. The second row of holes controls retraction of the electrodes. By selecting the proper rivet to pull out of the hole, the electrodes can be made to retract in any desired position. The table is automatically controlled so that, if desired, it will, upon finishing the work on one end of the table, automatically move to the center and start welding on the work that has been loaded on the other end of the table.

The roof and side machine move along tracks that are over twice the length of a railroad car. Welding power, control, air and water lines must connect to the machine at all positions. This becomes quite complicated when about 40 control wires, in addition to power cables, and water and air hoses are involved. All of the leads are brought up in the center at the top of the jig and pass around sheave wheels on a movable carriage and then to the welding machine. This serves to hold the carriage as far from the welding machine as the length of the leads will permit,

thereby keeping slack out of these cables and hoses at all times.

The three machines described all have electronic controls that perform the following functions: (1) Sequencing of operations; (2) indexing of welds; (3) timing of welding current; (4) interruption of welding current, and (5) maintaining welding current constant. The sequence panels and synchronous control panels have been described by the manufacturer in various papers.* Phototube control for indexing of welds is novel in the resistance welding in-

* Palmer, H. L. "Electronic Welding Control," *Electronics*, September 1942, *Application of Ignitrons to Resistance Welding Control*. AIEE Technical Paper 40-146, Cooper, B., "Better Welds Through Regulated Welding Current," *The Welding Journal*, January 1944.

dustry, and especially in the indexing of a table having such a large mass. The electronic current compensator has been found to be a very useful instrument. Remarkable consistency in welds is produced by the use of this control that compensates for line voltage variations and impedance variations in the welding current.

Standard single spot types of machines are used in miscellaneous subassemblies, such as stiffeners to roof sheets, battery boxes, partitions, cabinets, lockers, and many other items.



FIG. 9—Setting up the indexing pattern on the multiple spot welder by removing loose rivets at appropriate points to actuate the phototube relay. Once the pattern has been set, machine operation is fully automatic and virtually foolproof.

New Castable Refractory Withstands 3000° F

A CASTABLE refractory which is said to easily withstand temperatures as high as 3000°F and which shows excellent stability and resistance to spalling under repeated heating and cooling cycles has been developed by the refractories division of Babcock & Wilcox Co. The cement, called Kaocast, is expected to fill the need for a refractory castable in the construction of industrial furnaces operating at a temperature ranging from the top limit of standard refractory castables up to as high as 3000°F. Other features of Kaocast include its very small volume change on initial firing and its lack of shrinkage or expansion under continuous use at high temperatures.

Because it can be either poured into place like ordinary concrete used in construction work, or used as a ramming mixture Kaocast will effect considerable savings in furnace construction. This is particularly true of furnaces requiring extensive use of special shapes which were formerly made of kiln-fired materials or of refractory plastics. Kaocast can be used either for the quick fabrication of these special shapes, or to form part or all of the furnace lining.

Other applications where Kaocast is expected cut construction time and reduce furnace maintenance include its use as a covering for studs in water-cooled furnace walls and in forming high temperature baffles. Its ability to resist spalling also makes it suitable for use on furnace car tops subjected to repeated heating and cooling cycles. Because its volume change is

negligible under high temperatures, Kaocast is said to be ideal for deep patching of spalled or eroded brickwork.

Some typical properties of Kaocast are given in the following table:

Use Limit	3000°F
Melting Point	3190°F
Permanent Linear Change, pct	
After heating to:	
2500°F	Less than 0.25
2900°F	Less than 0.25
3000°F	Less than 0.25
Panel Test	
Shrinkage:	
No measurable shrinkage after 24 hr at 3000°F and 24 hr at 2900°F.	
Spalling:	
Less than 2 pct loss in 10 cycles at 2650°F after firing for 24 hr at 3000°F and 24 hr at 2900°F.	
Mechanical Strength, psi, average:	
Modulus of Rupture:	
Dry	300
After firing for 5 hr at:	
2500°F	600
2900°F	1000
3000°F	1300
Cold Crushing:	
Dry	600
After firing for 5 hr at:	
2500°F	650
2900°F	2600
3000°F	3300

Engineering Applications of

By **FREDERICK G. SEFING**
Development & Research Div.,
International Nickel Co., Inc.,
New York

THE effects of thermal expansion are generally given due consideration in such construction as pipe lines, bridge members, precision machines and scientific instruments. There are, however, many applications where thermal effects are not generally considered but where temperature differentials, differences in expansivity or thermal stresses may cause early failure of the equipment.

Consideration of the expansivity characteristics of metals, along with other service requirements, often makes possible substantial increases in service life

over installations in which expansivity is not taken into consideration. This article covers a number of practical applications wherein improved service life was realized through the use of a metal having suitable expansion characteristics. These discussions cover in particular the Ni-Resist group of cast nickel alloys which, because of the presence of graphite similar to that found in gray iron, have high damping capacity and high resistance to wear with the added advantages of excellent resistance to corrosion, good machinability and a wide selection of expansivities.

TABLE I
Mechanical Properties of Ni-Resist

	Type 1	Type 2 20% Nickel	Types 1a and 2a HI Strength	Type 2b Heat Resistant	Type 3 30% Nickel	Type 4 Stain Resistant 30-5-5	Type 5 Minovar
Tensile strength (thousand psi).....	25-30	25-30	30-50	25-45	25-35	25-35	20-25
Compressive strength (thousand psi)....	100-120	100-120	120-140	130-160	100-130	80	80-100
Torsional strength (thousand psi).....	35-40	35-40	40-50	45-60	35-45	20	30-35
Torsional modulus (million psi).....	4.5	4.5	5.2	5.5	5.0	4.0	4.5
Modulus of elasticity (million psi) (at 25 pct of T.S.).....	12-14	15-16.2	16-16.9	15-16.5	15-15.5	15	10.5
Permanent set point (psi).....	3,000	3,000	6,000				
Transverse properties (18 in.):							
Load—(1000 lb).....	2.0-2.2	2.0-2.2	2.2-3.0	2.4-2.8	2.0-2.4	1.8	1.8-2.0
Deflection—(in.).....	0.3-0.6	0.3-0.6	0.5-0.9	0.2-0.4	0.5-1.0	0.3-0.6	0.5-1.0
Vibration damping capacity.....	High	High	High	Medium	High	Medium	High
Endurance limit, psi.....	12,000	12,000	15,700	18,000	13,500	9,000	9,900
Hardness, Brinell:							
Low chromium.....	130-160	130-160	145-190				100-125
High chromium.....	100	100	150	170-250	120-150	150-180	125-140
Toughness by impact (ft-lb ¹).....	3/16	3/16	3/16	60	150	80	150
Pattern shrinkage (in. per ft).....	3/16	3/16	3/16	3/16	3/16	3/16	3/16
Machinability.....	Good	Good	Good	Very poor ²	Good	Fair	Good

¹ 1.2 arbitration bar unnotched—struck 3 in. above supports.

² With 3.0-4.0 pct CR the machinability is fair.

TABLE II
Physical Properties of Ni-Resist

	Type 1	Type 1-A	Type 2, 20 pct Ni	Type 2-A, High Strength	Type 2-B, Heat Resisting	Type 3, 30 pct Ni	Type 4, Stain Resisting 30-5-5	Type 5, Minovar Cast Iron
Specific gravity, g per cc.....	7.3	7.35	7.3	7.35	7.4	7.4	7.4	7.4
Density, lb per cu in.....	0.264	0.266	0.264	0.266	0.268	0.268	0.268	0.268
Melting point, degree F.....	2,250	2,300	2,250	2,300	2,300	2,250	2,200	2,250
Thermal expansion (70° to 400° F) (millionths per °F).....	10.7	10.7	10.4	10.4	10.4	5.25	9.4	3.5
Thermal conductivity, cal per cc per sec per degree C.....	0.095	0.095	0.095	0.095	0.095	0.094	0.090	0.094
Electrical resistivity, microhms per cc.....	140	140	170	170	....	....	160	....
Temperature coefficient of electrical resistance at 70° to 800° F.....	0.0001769	....	....	....	....	....	....	....
Magnetic response.....	non- magnetic	non- magnetic	non- magnetic	non- magnetic	magnetic	magnetic	slightly magnetic	magnetic

of Controlled Expansion Alloys

Consideration of the expansivity characteristics of metals, along with other service requirements, often makes possible substantial increases in service life over installations in which expansivity is not taken into consideration. This article cites a number of practical applications of this aspect of the physical behavior of metals wherein improved service life was realized through selection of a material having suitable expansivity. Examples of both high expansion and low expansion applications are cited.

Tables I and II list the mechanical and physical properties, respectively, of various types of Ni-Resist. The thermal expansion coefficients of table II are charted in fig. 1, wherein it is seen that expansivities can be selected at room temperatures between 2.2 and 10.7 millionths per degree F. These alloys have been applied to meet particular expansion problems in a variety of ways, some of which will be cited herein, to illustrate how engineering problems have been solved by proper and judicious application of the type of Ni-Resist having the desired expansivity.

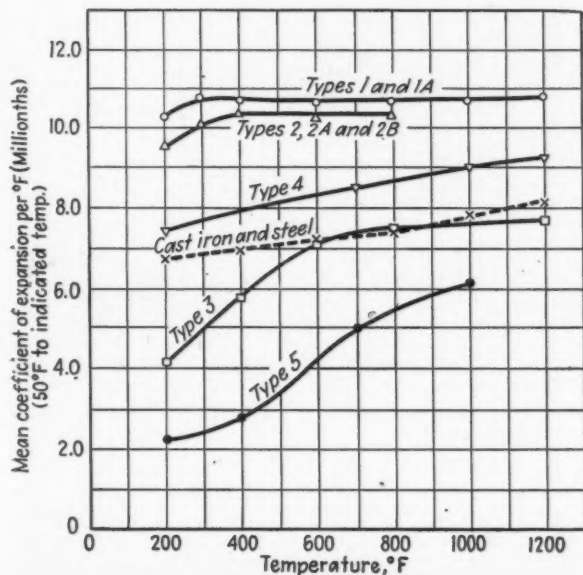
Engine cylinder liners of type 1 Ni-Resist are being mounted in aluminum cylinder blocks to provide the combination of high expansivity and superior resistance to cylinder wear and corrosion. From the data of table III, it is seen that Ni-Resist at 10.7 millionths per degree F approaches that of Y aluminum alloy at 12.5 and practically equals that of Lo-Ex aluminum at 10.5 millionths per degree F at room temperatures.

The significance of this combination is that the Ni-Resist liner more closely follows the expansion of the cylinder block in the service temperature range up to 700°F. This means that metal-to-metal contact is more effectively maintained and, therefore, better heat transfer is provided from the liner to the cylinder block. If the liner separates from the block at the top or hottest zone of the cylinder, excessive

temperatures of the liner develop and pre-ignition sets in.

From table III, it is seen that the shrink fit required to accommodate the expansion differences between Ni-Resist liners and aluminum blocks is considerably less than that required for gray iron and steel liners. Indeed, the necessarily high shrink fit stresses exerted on the aluminum cylinder block by the gray iron and steel liners would tend to deform the aluminum block, which, in effect, would reduce the shrink fit, after which the liner would no longer maintain adequate contact at operating temperatures.

Ni-Resist liners cast integrally with aluminum cylinder blocks will distort to a minimum extent at normal service temperatures because of the similarity of expansion. With gray iron or steel and aluminum



ABOVE

FIG. 2—An aluminum piston with Ni-Resist ring grooves. The Ni-Resist is used to match the expansivity of the aluminum and for wear resistance.

LEFT

FIG. 1—Coefficients of expansion of various types of Ni-Resist.

TABLE III					
Expansion Data for Aluminum Engines					
	Ni-Resist	Gray Iron	Steel	Aluminum Alloys	
				Y Alloy	Lo-Ex
Expansion coefficients, millionths per degree F 70° to 200°	10.3	6.5	6.2	12.5	10.5
70° to 400°	10.7	6.8	6.6	13.0	11.1
70° to 600°	10.7	7.2	6.9	13.6	11.6
Total expansion at 400° F.	3.53	2.24	2.18	4.29	3.96
Total expansion at 600° F. (thousandths)	5.66	3.82	3.66	7.20	6.16
Shrink fit required for 600° F service (thousandths)					
With Y Alloy	1.54	3.38	3.54	....	....
With Lo-Ex	0.49	2.33	2.49	....	....
Shrink Fit Stresses					
With Y Alloy	24,300	50,500	102,500	....	....
With Lo-Ex	7,800	35,000	72,200	....	....

bonded cylinders, a bimetallic distortion with temperature changes is inevitable from the high expansion stresses. This distortion of the cylinder walls causes ring flutter and ring fatigue which are very deleterious to good engine performance. An aluminum piston with Ni-Resist ring grooves is shown in fig. 2. The Ni-Resist is used to match the expansivity

of aluminum and for wear and heat resistance. Other examples of the use of high expansion types 1 and 2 Ni-Resist are: 18-8 stainless steel vanes as inserts cast in a Ni-Resist body; 18-8 stainless steel shafts and pump parts using Ni-Resist glands, wearing and sealing rings for matching expansivity and resistance to galling and corrosion; Ni-Resist heating units for copper heads in soldering irons. Reciprocating pumps handling hot oil require resistance to wear and corrosion at the expansivity level of steel. From fig. 1 it is seen that at temperatures from 500° to 1200°F the expansivity of type 3 Ni-Resist is the same as that of steel. Fig. 3 illustrates an application wherein type 3 Ni-Resist provides a wear and corrosion resistant lining for a steel pump operating at temperatures above 500°F and will not separate from the body or cause undue thermal stresses over a wide range of temperatures.

Precision Parts

In castings requiring low expansivity for dimensional stability, such as spindle housings, scientific instruments, gages and measuring devices, valves and jigs, type 5 Minovar has been used to combine the properties of low expansion with gall resistance, vibration damping capacity, good machinability and resistance to corrosion. Fig. 4 shows the effect of nickel content on gray iron compositions and that

TABLE IV							
Thermal Stress Characteristics Between 70° and 250°F of Various Metals							
CAST METAL	(1) Tensile Strength, Thousand psi	(2) Endurance Limit, Thousand psi	(3) Elastic Modulus, Million psi	(4) (5) Thermal Expansion Coefficient X 10 ⁻⁶ (70°-212° F)		(6) Stress (psi) Developed by a Sudden Temp. Change of 70° to 250° F S = ctE (Equation 1—below)	(7) Ratio: Thermal Stress Over Endurance Limit 70° to 250° F
				°F	°C		
(1) Magnesium.....	25	7	6.5	15.7	28.3	18,400	2.6
(2) Aluminum							
Alloys: 8 pct Cu.....	22	9	10.3	12.5	22.5	23,200	2.6
Low Exp.....	35	.....	10.3	10.5	18.9	19,500	.....
Y Alloy.....	45	9.5	10.3	12.5	22.5	23,200	2.4
(3) Brass							
Red.....	30	9 ¹	11	10.2	18.4	21,000	2.3
Yellow.....	45	16	15	11.1	20.0	30,000	1.9
(4) Bronze							
88-10-2.....	30 to 45	9 ¹ to 13	15	10.0	18.0	27,000	3.0 to 2.0
(5) Ni-Resist							
Type 1.....	25 to 50	11.2 to 22.5 ³	13.5 to 16.6	10.7	19.3	26,000 to 31,700	2.3 to 1.4
Type 2.....	25 to 50	11.2 to 22.5 ³	15 to 16.6	10.4	18.7	29,000 to 31,000	2.5 to 1.38
(6) Austenitic steels (chrome-nickel).....	65 to 85	32.5 to 42.5	29	11.0	20.0	58,000	1.8 to 1.4
(7) Low strength cast iron.....	25	11.2 ³	12	6.5	11.7	14,000	1.25
(8) Al-Bronze.....	70	22	15	9.1	16.4	24,200	1.10
(9) Steel pearlitic (plain and 4 pct chrome).....	60	30	29	6.5	11.7	34,000	1.13
(10) Medium strength (cast iron).....	35	15.7 ³	14	6.5	11.7	16,400	1.05
(11) Steel pearlitic (plain and alloy structural and 4 to 18 pct Cr steels).....	68 to 150	34 to 75	29	6.5	11.7	34,000	1.0 with steel of 88,000 TS to 0.45 with steel of 150,000 TS
(12) High strength cast iron.....	60	27 ³	20	6.5	11.7	23,400	0.87
(13) Ni-Resist							
Type 3, 30 pct Ni-3 pct Cr.....	30	13.5 ³	15	4.3	7.7	11,500	0.85
Type 5, 35 pct Ni.....	22	10 ³	10.5	2.4	4.3	4,300	0.43
(14) Monel (cast).....	75	31.5	19	7.2	13.0	24,600	0.78
(15) Invar (wrought).....	75	37.5 ²	21.4	1.4	2.5	5,400	0.145

¹ Assume endurance limit of 30 pct of tensile strength. ² Assume endurance limit of 50 pct of tensile strength. ³ Assume endurance limit of 45 pct of tensile strength. Equation 1: S = ctE. Where S = stress in lb for 1 sq in., c = coefficient of linear expansion; t = temperature change; E = modulus of elasticity.

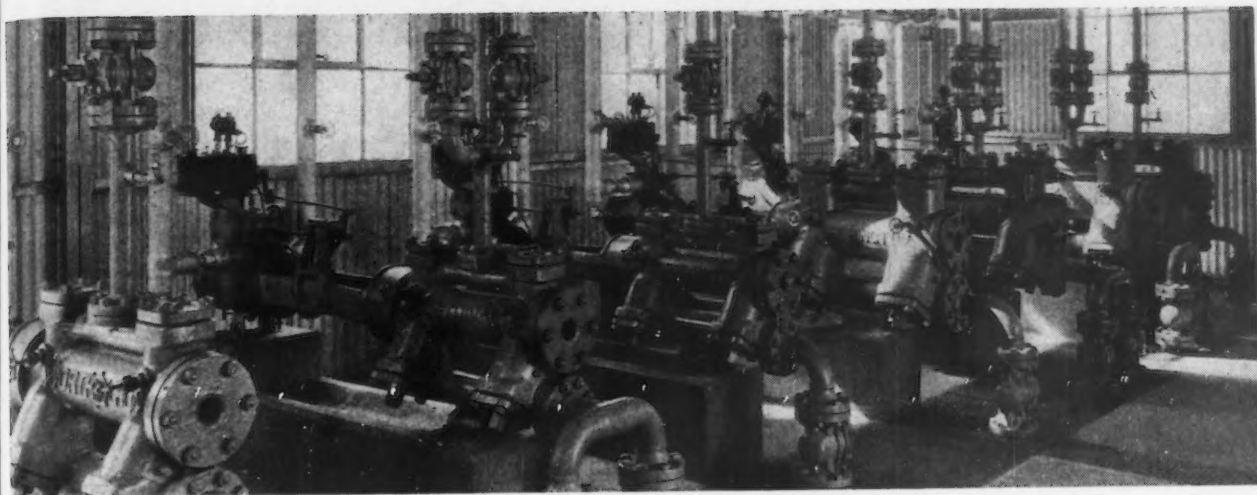


FIG. 3—Hot oil pumps equipped with type 3 Ni-Resist cylinder liners for wear and corrosion resistance. The expansivity of the liners closely matches that of the pump cylinders to prevent the liners from separating from the body and to avoid undue thermal stresses over a wide range of temperatures.

nickel between 34 and 36 pct. yields the minimum expansivity (2.2 millionths per degree F) for the temperature range between 50° and 125°F. Where dimensional tolerances on manufactured parts of the magnitude of 0.0001 in. are significant, the designer of the machine tools for making these parts may well study the influence on the manufactured parts of temperature changes within the members comprising the machine tools. Such members made of this low expansion nickel alloy will generally offset the undesirable effects of local heating caused by friction or by the cutting, lubricating or hydraulic oils.

Where forming dies for soap, paper plates, plastics, etc., are required to match closely over a temperature range up to about 400°F, this low expansion alloy maintains proper alignment and offers the additional properties of good wear resistance against the abrasion of the plastic, paper, etc., and corrosion resistance to prevent discoloration of the products formed.

Thermal Stresses Affected by Expansivity

Thermal stresses generally increase in proportion to the expansivity and the modulus of elasticity or stiffness of the metal. For example, rigidly held gray iron with 6.5 millionths per degree F expansion and a modulus of elasticity of 14,500,000 psi can develop half the stress of rigidly held steel with the same expansivity and 29,000,000 psi modulus of elasticity. The steel would be stressed 34,000 psi with a sudden temperature change between 70° and 250°F, while the cast iron would be stressed 17,000 lb.

Furthermore, comparing the above cast iron with a bronze having a modulus of 14,500,000 and an expansion coefficient of 10 millionths per degree F, the possible stresses developed by the same sudden temperature change between 70° and 250°F in rigidly fixed parts would be 26,100 psi for the bronze compared with 17,000 psi for the cast iron.

Throwing such high stresses on rigidly held castings may cause early failure because the stresses (see table IV) are often above the endurance limit of the metal or at such a level that corrosion accelerated fatigue sets in. Realizing that these high thermal stresses can be developed, it is not so amazing that pumps, valves, kettles, etc., occasionally

crack in thermal shock service. On the contrary, it is amazing that not more failures occur under such conditions. It is obvious that thermal stresses should be held down to a safe value, that is below the endurance limit or, in corrosion service, below the corrosion fatigue limit.

Low thermal stresses in thermal shock service can be realized by using metals with low expansion coefficients and/or low elastic moduli. An examination of table IV indicates what can be accomplished by properly utilizing those properties of various metals. Thermal expansion coefficients of metals vary all the way from 1.4 millionths of Invar to 15.7 millionths per degree F of magnesium (table IV, columns 4 and 5). The stresses possible from thermal shock between 70° and 250°F are shown in column 6, table IV.

It is evident that thermal stresses can exceed the endurance limit of the metal in thermal shock service of rigidly held parts. When stresses beyond the endurance limit are repeatedly developed, fracture may occur within a short time, hence only those metals are safe to use in thermal shock service in which

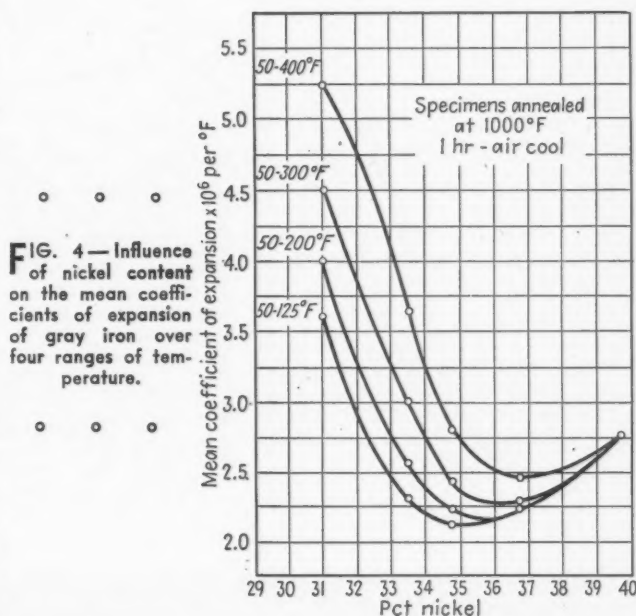


FIG. 4—Influence of nickel content on the mean coefficients of expansion of gray iron over four ranges of temperature.

the thermal stresses developed are below the endurance limit. Or it may be said that only those metals are suited to a specific type of thermal shock that have a ratio of thermal stress to endurance limit of one or, preferably, less than one. See column 7, table IV.

As the cycling service temperature range increases, the resulting higher thermal stress increases the demand for metals with low expansion or low elastic modulus. These properties will maintain low thermal stresses and thus keep the thermal stress below the endurance limit. The advantage of high strength

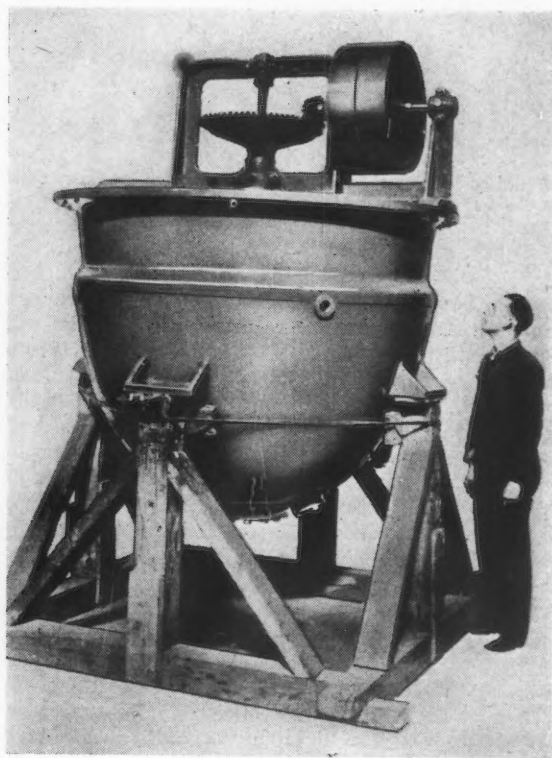


FIG. 5—Seamless chemical kettle cast in type 3 Ni-Resist. This material has low expansivity and thus is capable of withstanding considerable thermal shock caused by process cycles.

metals with high endurance limits can be seen by examining the low and high strength steels or cast irons (items 7, 9, 10, 11 and 12, table IV).

Following are some typical examples of how low expansivity has been successfully applied in thermal shock service in the chemical industry.

A spent lye solution in the soap industry was being filtered through a press filter at 175°F. After each filtration the press was washed down with tap water at about 60°F. Plain iron filter plates badly corroded and cracked in 1 to 2 years' service. Ni-Resist plates of 30 pct Ni with two thirds of the expansion of plain iron have been in service since March 1938 with no cracking. In fact, these plates show practically no tendency to warping and very little corrosion.

In another instance, cast iron jacketed kettles were contaminating pastel colored plastics so that true colors could not be maintained. The service temperatures cycled every 10 hr between room temperature and about 280°F. Type 2 Ni-Resist jacketed kettles maintained their efficiency and prevented contamination. However, after 1 to 3 years of service the large

1000-gal kettles cracked due to the stresses induced by the high expansion of this metal. Kettles of type 3, 30 pct nickel Ni-Resist, with much lower expansivity, were installed and have operated successfully and efficiently for over 5 years, and have also prevented contamination of the plastic. Cast kettles being produced in type 3 Ni-Resist are shown in fig. 5.

Citing another example, pumps handling 30 pct caustic and 4 pct NaCl at 280°F were flushed out with cold sea water six times every 24 hr. Cracking of plain iron and type 2 Ni-Resist occurred after a few days' service. Replacement with pumps of 35 pct Ni low expansion Ni-Resist has resulted in continuous service since January 1941. Type 3 30 pct Ni Ni-Resist has also proven satisfactory in this application.

Filter drums and grids, valves and pumps, made of 30 and 35 pct Ni Ni-Resist demanding resistance to wear and corrosion, have been successfully used in thermal shock service between room temperature and up to 450°F.

Corrosion Effects Reduced by Low Expansivity

When a metal is subjected to thermal shock or sudden temperature changes, the thermal stresses set up may cause cracking or early failure by corrosion fatigue. Furthermore, in corrosive service the expansion and contraction of the metal under fluctuating temperatures can flake off the corrosion product film which should adhere firmly to the metal for the greatest corrosion protection.

One of the important features of a corrosion-resistant metal is that the coating produced by the material handled adheres firmly to the base metal. With low expansivity the movement of the metal with changes in temperature is reduced and so the corrosion product film which protects the metal is less likely to be flaked off. This has been borne out in the applications of filter plates and caustic pumps cited previously. The condition of these castings after several years of service demonstrates even better corrosion resistance than the early corrosion tests had indicated.

In thermal cycling service the expansion stresses set up are often high enough to become critical or above the corrosion fatigue limit. For example, the mechanical stresses of a valve body handling hot caustic soda may be 1000 psi. The thermal stresses when the valve is suddenly heated from room temperatures to 250°F may reach 17,000 psi when made of cast iron, or 34,000 psi when made of steel. When made of the lowest expansion type of Ni-Resist containing 35 pct Ni, however, the thermal stresses would be only 4300 psi and the margin of safety against stress corrosion failure is materially increased.

Summarizing, then, from the wide selection of expansivities available in the various types of Ni-Resist, type 1 or 2 is used to match the high expansivity metals, while type 3 is chosen to match the expansivity of steel at 500°F and above, and type 3 or 5 is selected to be used with low expansivity porcelain, or with refractories such as insulators, chimney and furnace castings. Type 5 is also used for precision parts in accurate machine tools, instruments, etc.

In chemical equipment, where sudden or frequent temperature changes take place, more successful operation of this equipment can be realized by using low expansion metals which will prevent cracking, increase corrosion resistance and reduce failure by corrosion fatigue.



STANDARD rough-
ness specimens
being used in the
plant by an inspector
and machinist.

Practical Aspects of

Surface Finish Measurement Instrumentation

By JAMES A. BROADSTON

Armament Design Engineer,
North American Aviation, Inc.,
Los Angeles

The practical application of surface finish control, vital in assuring long service life and sales appeal, is discussed in this article. The author reviews the development of finish control and describes instruments available for measuring surface finish in the plant and comments on the effectiveness, costs and methods of using various types of finish control devices.

SURFACE quality is of the utmost importance to all who are concerned with the manufacture of precision machine parts. Instrumentation for its control has progressed to the point where it can be brought out of the laboratory and into the shop and will pay its way if properly used.

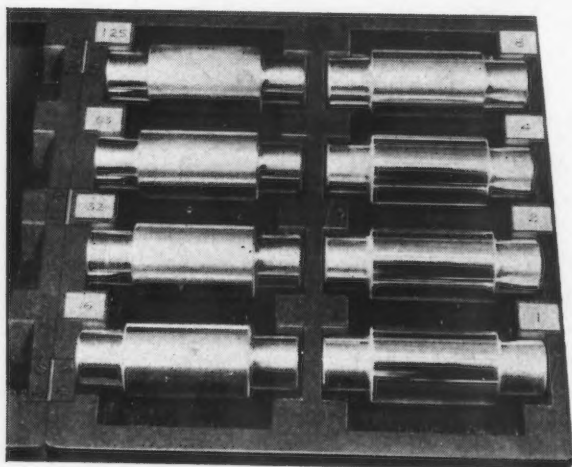
It has been said, and for many parts it is true, that the quality of surface finish may have a far greater influence upon the life and proper functioning of a part than either its composition, strength or dimensions. Since adequate controls are set up for these latter properties, it is reasonable to be-

lieve that the proper control of the surface finish would be even more worthwhile.

Surface quality control today lags far behind existing instrumentation, primarily because there are so many men now in industry who do not realize that this instrumentation is no longer a laboratory curiosity but has grown up to the point where it can offer real and tangible help in all machine shops, laboratories or wherever any machine work is done.

Many of you may say to yourselves that you make only a few special precision parts; that you do not have any real production to speak of; or that all of your men are specialists, hence you have no trouble anyway, so why bother to control surface finish? Despite this attitude, it must be stressed there is a place in any shop for a program of surface quality control, whether the shop has one lathe or consists of a whole plant full of machinery. Such a program will include the use of not only surface finish measuring devices, but also a practical system for the designation of finish on all drawings of machine parts. This article is designed to assist in making

- Norton Co.; standard surface finish specimens consisting of eight ground steel specimens.



the proper selection of working tools for controlling the surface quality of a product.

In some industries, where mass production and interchangeable manufacture have made it necessary, dimensional limits have had to be imposed so that mating parts could be assembled easily and accurately and so that spare parts that would fit could be supplied to distant customers.

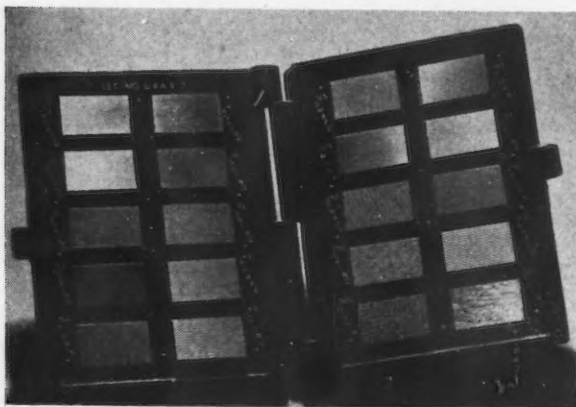
One of the chief reasons that many men still consider surface finish measurement in the class of laboratory technical hocus-pocus is because most of the articles on the subject have been written by research men who were seeking better ways to measure surface finish and were not primarily concerned with practical applications.

A study of the literature describing surface finish measuring equipment will reveal to the practical man that it is primarily suited to the measuring of very fine finishes. Before he can adapt this equip-

Typical sets of surface roughness standards for finger nail comparison, available in kits which can be easily handled in the shop, are shown on this page.

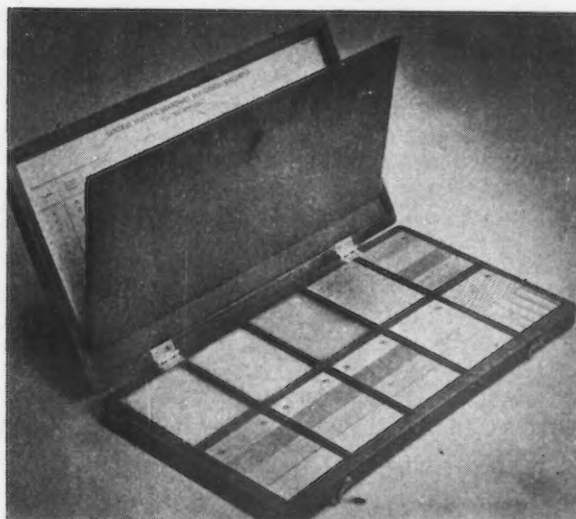
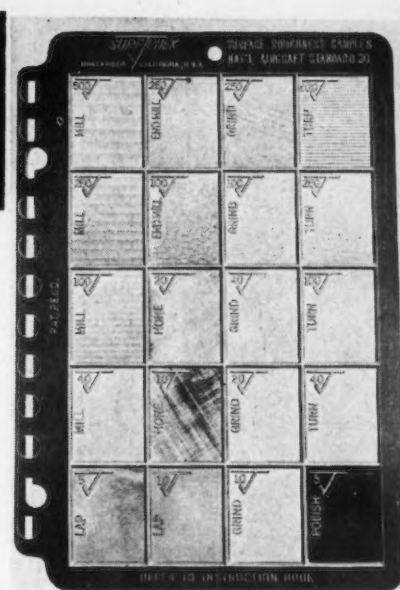


- U. S. Rubber Co.; Ekko pocket size surface finish replica standards.



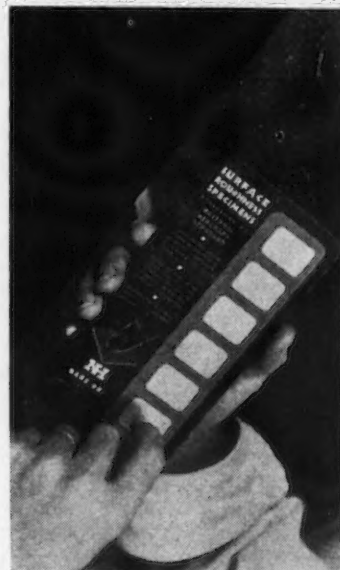
- RIGHT
- Surface Checking Gage Co.; Surf-Chek roughness standards.

- LEFT
- University Machine Co.; specimens of stainless steel.



- LEFT
- General Electric Co.; standard roughness specimens.

- RIGHT
- NH Gage Co.; surface roughness specimens.



Typical Tracer Point Units and Light Reflection Comparators

RIGHT

- Brush Development Co.; tracer point Surface Analyzer with RMS meter and recording oscillograph.

o o o

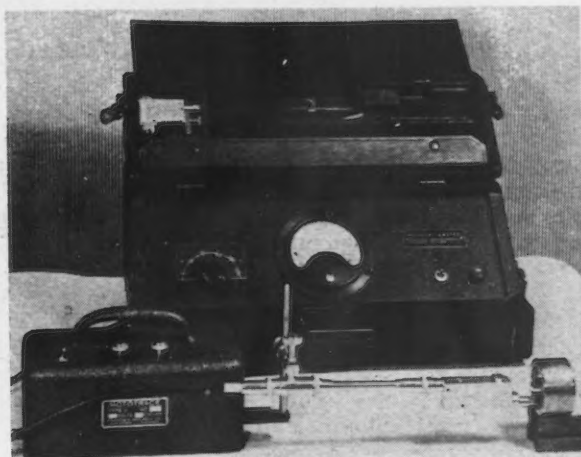
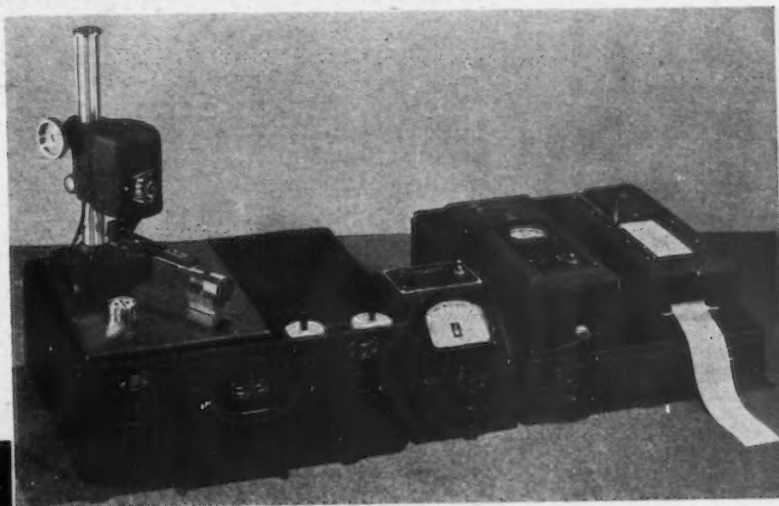
LOWER RIGHT

- Physicists Research Co.; Profilometer with Mototrace, a tracer point surface analyzer.

o o o

BELOW

- Comtor Co.; Comtor surface comparator of the light reflection type.



ment to his plant, he must realize that a program of surface quality control does not propose that super-smooth surfaces should be used everywhere. This is decidedly not the case. From an economic standpoint, rougher surfaces cost less than smooth ones. It is therefore seldom good economy to make a surface smoother than it really needs to be, unless it can be finished at the same time another adjacent surface is finished or unless the only means of sizing will actually produce a smooth surface.

The adoption of a proper drawing notation which will point out those surfaces of a part which need special care and a fine finish and those which can be allowed to remain rough will reduce costs by preventing misapplication of effort.

If costs are to be reduced and quality improved through the adoption of surface quality controls, it is necessary to determine which surfaces are critical and which are not. The designer is best able to determine these facts and properly designate them on the drawing at the time it is made.

There are many reasons why surface finish control is important, but they can only be briefly mentioned here. Among the qualities that are affected by changes in surface roughness the following might be included:

- (1) Life—how long will it last?—friction, abrasion, wear, lubrication, bearing area, and corrosion affects life.

- (2) Safety—how strong is it?—consider stress concentrations, fatigue strength, notch sensitivity and imposed loads.
- (3) Function—will it work properly?—must it slide freely, fit properly, prevent leakage, serve as a bearing, as a mating part or rub over packings without damaging them?
- (4) Appearance—does it look good?—how about adhesion of plating or other protective coatings such as paint? Are good looks important?
- (5) Heat transmission—rough surfaces are good radiators and heat absorbers, smooth surfaces serve better as insulators.
- (6) Are optical properties important?—transmission—reflection—refraction of light or heat?

Surface finish measurement equipment should be considered to include not only commercially available instruments such as tracer point analyzers,

¹ See "Measuring and Designating Surface Finish," by J. A. Broadston, THE IRON AGE, Oct. 19; Oct. 26; Nov. 2, 1944.

optical comparators, reflectivity meters and sample roughness blocks, either originals or replicas, but also all other devices for the purpose that have been used experimentally.

No attempt will be made to go into the details of operation of the various types of surface finish measuring devices. Much has already been written and

published¹ that discusses these devices thoroughly.

Tracer point analyzers have contributed more to the advancement of surface quality control than any other single factor. With all their precision as instruments, however, a recent unbiased study conducted by the National Bureau of Standards and the Army Ordnance Dept. and presented at a meeting of the subcommittee on the Standardization of Surface Roughness Blocks for Machined Surfaces held in Philadelphia, January 1946, showed that their readings are not always consistent or dependable over a wide range of surfaces.

This subcommittee, of which the author is a member, working under the auspices of the ASA sectional committee on Standardization of Classification and Designation of Surface Qualities, B46, sponsored by SAE and ASME, has recently submitted for the approval of the parent committee a proposed draft of the American Standard for Surface Roughness Blocks for Machined Surfaces. As a part of their study of the problem of surface standardization, several sets of Ordnance roughness standards were measured by tracer point analyzers in the arsenals and at the Bureau of Standards.

It is quite important, in using these sensitive instruments, that they be properly maintained and that the operator know their limitations. Often operators try to measure the wrong thing. Some of these limitations are mentioned in previous articles on the subject,¹ but the best way is to follow exactly the instructions of the manufacturers.

The fact that the tracer point itself induces certain errors due to its inability to precisely follow all of the surface irregularities, plus inherent differences in the response characteristics of the pickups, amplifiers and meters involved makes duplication of results by different instruments over long periods of time quite difficult. Although these tracer point analyzers are provided with calibration standards, these standards merely permit the instrument to be corrected so that it will read properly at but one point on the scale. For greatest accuracy they should permit the instrument readings to be checked near the center and toward the extremes of the useful range of measurement.

This difficulty of duplicating readings is delaying national standardization of surface roughness for machined parts. No one has yet designed a surface roughness measuring instrument that can be produced in quantity and have each unit maintain its accuracy or calibration over extended periods so that all will give the same reading on any given surface. The problem is not an easy one.

Another consideration is that no generally acceptable criteria have ever been evolved that will truly correlate the performance of different machine finishes. This is largely due to the fact that so many factors are involved. Different materials, various types of finishes and thousands of applications make the problem of correlating performance more difficult. Further, no agency has ever taken over a project to make a thorough and careful study of the results and observations of the many investigators.

As a result, it is doubtful if the so-called RMS (root mean square) average deviation from the mean in microinches (the generally acceptable unit for machine finish designation) is really any good, or for that matter any better than an approximate

arithmetical average as an index to the performance of any machined surface. At the present time, the trend is toward forgetting the RMS complication and using an average value until a really suitable index to performance has been evolved from tests on representative surfaces whose roughnesses are adequately known. Until research establishes the best index, surface finish measuring instruments will have to base their readings on existing units.

A recent survey conducted among the leading aircraft manufacturers by the National Aircraft Standards Committee revealed a preference for using the arithmetical average rather than the RMS by a vote of 21 to 2 as the average is easier to explain to workers. This preference was solicited in the interest of simplification, since it appears that the difference between the two units is less than the acceptable tolerances and within the accuracy range of existing instrumentation.

The practical man should not allow these facts to worry him unduly, for with any given instrument he can control the processing of his product within extremely close limits. By making samples of the surfaces that have given satisfactory performance, he can, by direct instrument comparison keep all further production under control. This is particularly true for very fine surfaces that are very essential to the continued satisfactory performance and life of his product. The Profilometer, manufactured by Physicists Research Co., Ann Arbor, Mich., and the Brush surface analyzer, manufactured by the Brush Development Co., Cleveland, are tracer point surface finish measuring instruments suitable for such work. The Comtor Surface Finish Comparator, made by the Comtor Co., Waltham, Mass., is one of the reflectivity meter types of comparators. It is equipped with a light source and a photo-electric cell which measures the light reflected from the surface to be compared with the sample. The meter reading serves as an index to the surface roughness. It is particularly suitable for very finely finished parts. While nothing will take the place of these precision instruments in measuring and comparing fine finishes, there are many rougher surfaces that also need adequate control in the shop.

Many manufacturers have found that the procurement of sets of standard surface finish samples for distribution to their workers has solved the problem as far as the average machine finishes are concerned. This can usually be done for an expenditure of considerably less than \$100 if the plant is not too large. In many cases, even the greater expense of a tracer point analyzer is justified, as some manufacturers have dozens of these units in one department. In other cases, it may not be justified and for these the use of standard roughness samples accomplishes the required control.

Both the tracer point analyzers and the surface finish samples require the use of a proper system of drawing designation. Such a method of drawing designation and quality control can be accomplished by using as reference a set of standard roughness samples. There are several types available and any of these that appeal to the user can be used in such a program. The University Machine Co., Cambridge, Mass., produces excellent stainless steel machined specimens.

Norton Co., Worcester, Mass., makes a set of surface roughness standards having various grinding finishes that are also original machined samples.

In the field of replica standards there are several manufacturers: General Electric Co., Schenectady 5; U. S. Rubber Co., Electroforming Dept., Detroit; Surface Checking Gage Co., Hollywood 28, Calif.; N-H Gage Co., North Hollywood, Calif. These types of surface standards are shown in the accompanying illustration.

These replica standards have many advantages. Their lower cost permits wider distribution, hence it is easier for all personnel along the line to check conformance with surface finish requirements. The engineer, inspector, machinist, assembler and everyone connected with the control of surface quality can easily, by fingernail comparison of the parts with the samples, tell if the parts are satisfactory in so far as surface finish is concerned.

Comparison is made by drawing a sharp fingernail lightly across the surface of the standard roughness specimen prepared by a similar process and then across the machined surface of the part whose roughness limits are being checked. It is easy to tell which of the two surfaces is the rougher. By comparison with another of the standard roughness blocks, the finish of the part can be closely estimated. Many times it has been shown that even an inexperienced person can immediately detect a difference of only a few microinches on some types of surfaces. For rougher surfaces that are not

critical from a performance standpoint, visual comparison with the standard surfaces is sufficiently accurate. If the drawing designates the required finishes of the various surfaces of the part, control of the surface quality is easily possible by reference to these roughness standards.

There are many other methods for evaluating surface finish that have not been successful enough to leave the laboratory. Many of these have helped immeasurably in certain applications.

Among them may be mentioned taper sectioning; the use of a phonograph pickup for comparison; optical sectioning by a straight edge shadow; film replicas for projection; taper sectioning by inclined light beam; air leakage or light leakage between the surface and a standard orifice; friction tests; oil adhesion tests; and the honing stick test. Space is not available for a discussion of each of these methods, but reference to existing literature on the subject will reveal greater details about them.

Surface finish measurement instrumentation has already contributed a great deal toward the improvement of the science of interchangeable manufacture. With proper application, it can easily contribute a great deal more. With such great opportunities ahead for improved instrumentation, as well as improved utilization, it is believed that the day is not far off when surface finish control will be as universal as dimension control is today.

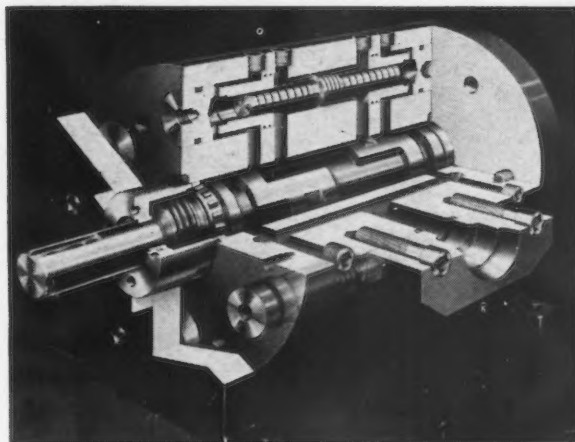
Booster Increases Hydraulic Pressure

A NEW oil-hydraulic pressure booster, capable of supplying pressures up to 7500 psi, has been announced by Hydro-Power, Inc., Springfield, Ohio. High pressure hydraulics are brought into sharp focus by the new unit, which makes available working pressures substantially higher than those normally obtained with high pressure pumps.

A compact, multi-plunger intensifier, the Hydro-Power booster will multiply by as much as three times the pressure of the oil it handles in a hydraulic circuit. The power unit comprises a cylinder block having a nest of six parallel bores, each fitted with a reciprocating, double-acting piston. A central rotating valve member connects the pistons with the source of pressure fluid. As the valve rotates, the oil connections are made successively to the pistons, alternating from one end to the other to provide an uninterrupted pressure flow.

Operating without any appreciable increase in system horsepower, the new booster requires additional power only for the rotation of the central valve. The drive shaft is an integral extension of the valve itself, providing a direct drive for the latter.

In operation, the valve is in complete hydraulic balance, entirely eliminating high bearing loads which are usually encountered in high pressure power equipment. Easily installed in either new or old hydraulic circuits, the new unit is expected to prove advantageous in a variety of applications.



CUTAWAY view of the Hydro-Power booster showing the arrangement of the plungers and the rotary valve. Pressure can be boosted up to three times that of the inlet pressure with no additional power required other than that needed to rotate the valve.

Where higher pressures are intermittently needed—as when difficult work requires a particularly heavy working stroke—the new pressure converter is particularly useful. By valving the discharge of the low pressure system pump through the booster, pressure up to three times the rating of the pump can be obtained whenever extra power is desired. Such high pressure operation can be manually controlled, or set to function automatically during the working phase of the operating cycle, so that normal traverse speeds are maintained. Only simple control is required, without extensive modification of the circuit. Hydro-Power boosters are built in two standard sizes, 35 and 100 gpm input.

By H. A. FROMMELT
Consulting Engineer, Chicago

How to Use Carbide

DETERMINATION of the machinability of various types of stainless steel was made possible through a research program sponsored jointly by the Rustless Iron & Steel Corp., Baltimore, and Kennametal Inc., Latrobe, Pa. The former provided both skilled personnel and materials necessary for a comprehensive series of runs to determine the machinability of these materials using a carbide milling technique. The latter company provided the milling facilities and techniques, using a suitable grade of carbide and a cutter design that had proven successful in a wide range of applications.

The experimental work was carried on in the Latrobe plant of Kennametal Inc. where knee-type machines ranging in power from 10 to 50 hp (spindle motor) were available. Two of the 50 hp machines were of the Milwaukee CSM design specially engineered for carbide milling of steel. All other machines used in this experimental program were of standard design.

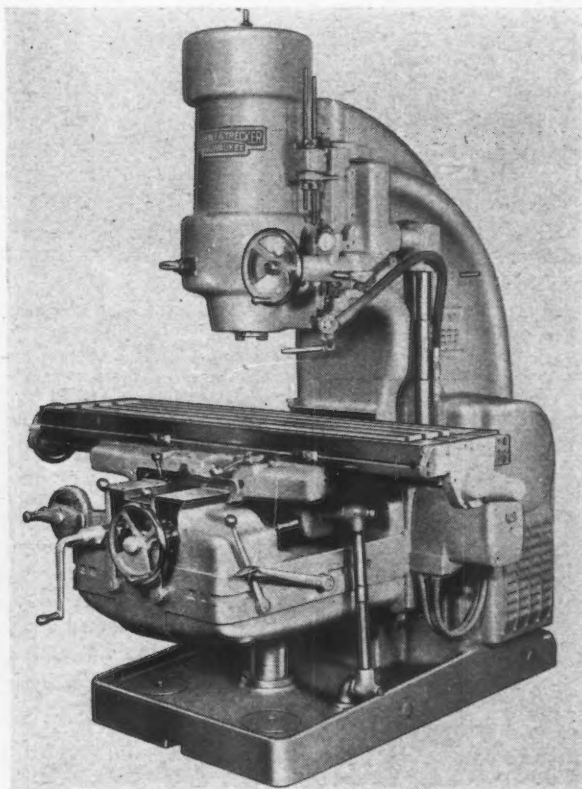
This discussion represents a condensed report of this research program. Until these results were made available all stainless steels were considered to have an extremely low machinability rate which, indeed, decreased exactly to zero when milling was attempted. Single point tool processing of some grades has always

resulted in fairly good results but removal of this metal by milling has been considered, for all practical purposes, uneconomical.

The experimental work will be described first with an experimental rather than shop or production approach. Since the experimental activities conducted during the summer of 1945, successful milling of the stainless series is being carried out under actual shop and production conditions. These will be reported in another article.

The machines on which the milling of these alloy steels was performed are of the type shown in fig. 38, a Kearney and Trecker 50 CSM, or the 50 hp carbide steel milling series. This machine tool has 50 hp available on the spindle and 5 hp on the table. A 16-in., 340 lb flywheel provides a smooth flow of power to the cutter and is, therefore, of special advantage in carbide milling with a coarse tooth pitch cutter of the type shown in fig. 39.

It is necessary to add here, however, that the width of the cut in these experimental runs varied from 4 to 6 in., but never less than 4 in. This is indicated in fig. 40. Moreover, the tooth pitch in the cutter used (See fig. 39) is never greater than $3\frac{1}{2}$ in. (or π) since the number of teeth equals the diameter in

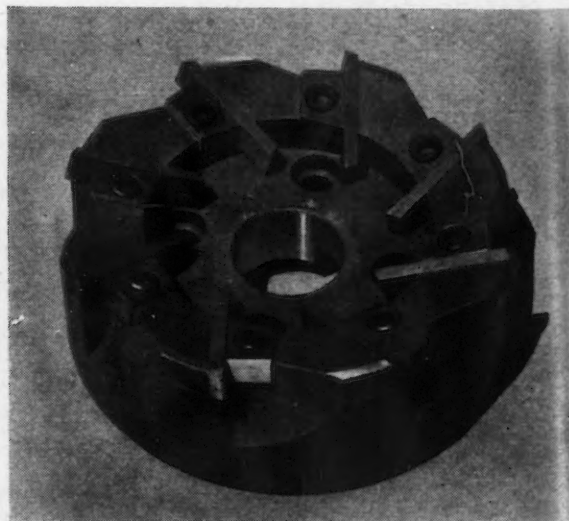


LEFT

FIG. 38—This type of milling machine was used for the stainless milling research program described in this article. It has 50 hp at the spindle, a 340 lb built-in flywheel, and was specially designed for carbide milling.

BELOW

FIG. 39—Type of cutter used for most of the experimental cuts. This is an 8-in. universal face mill having eight solid carbide blades set at a 15° positive radial angle.



le Cutters for Milling Stainless Steels

inches). Hence in these runs there are always two teeth engaged in the workpiece, which lessens the impact blow delivered to the cutting tooth or blade upon entrance into the work. Where one tooth leaves the work before the following tooth enters, the effect of this impact is immediately evident in a lowered tool life. In all milling the effect of the flywheel, if designed into the machine, is on the side of better results, including finish, accuracy, and above all, life. This is more so when the nature of the cut is exaggerated in its interruptions, as when the tooth pitch of the cutter is greater than the workpiece face width. It is then that the gear train play is suddenly taken up with a tooth entrance only to be released with tooth exit.

This taking up and releasing of backlash or play in the gear trains and bearings heightens the nature and effect of the impact blow on the cutting teeth. A flutter is set up in the cutter which has the effect of rapidly delivered hammer blows on the teeth. And this phenomenon decreases cutter life appreciably. In fact, the difference between tool life in milling and single point uninterrupted machining is so great that it cannot be explained in any other manner. It is only logical, therefore, to assume that the hammer blows delivered to each tooth on entrance are the cause. The difference in life between milling and single point machining is in the order of ten times. The actual amount is difficult to measure since it is practically impossible to duplicate the machining processes.

The milling of stainless steels in this research program was performed on machines both with and without benefit of flywheel. The results did not differ

The technique of milling stainless steels with carbide cutters is described in this article. Recommendations for the most suitable blade angles for type 304 on the one hand, and all other types on the other hand are made on the basis of a detailed research program in which many hundreds of experimental cuts were made under carefully controlled conditions. This article is the sixth of a series describing modern methods of using carbide cutters for milling various types of metals.

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appreciably, and it is logical to assume they would not differ in view of the nature of the cut, namely, with two teeth engaged at all times. This explanation will be of value to those planning the processing of stainless but who do not have a milling machine with a built-in flywheel design. If the cuts contemplated are light and such that two teeth will at all times be engaged, then a machine without flywheel can be considered.

Types of Cutters Used

The cutters used in this stainless research were of two types, the 8-in. diam universal face mill shown in fig. 39, and the 6-in. step mill shown in fig. 41. The former is shown applied in fig. 40 on a 50 hp horizontal milling machine.

The 8-in. universal face mill is of the solid carbide blade design with the blades mechanically held in

FIG. 40—Horizontal milling operation showing the minimum size of workpiece used to insure that there would always be two blades in contact.

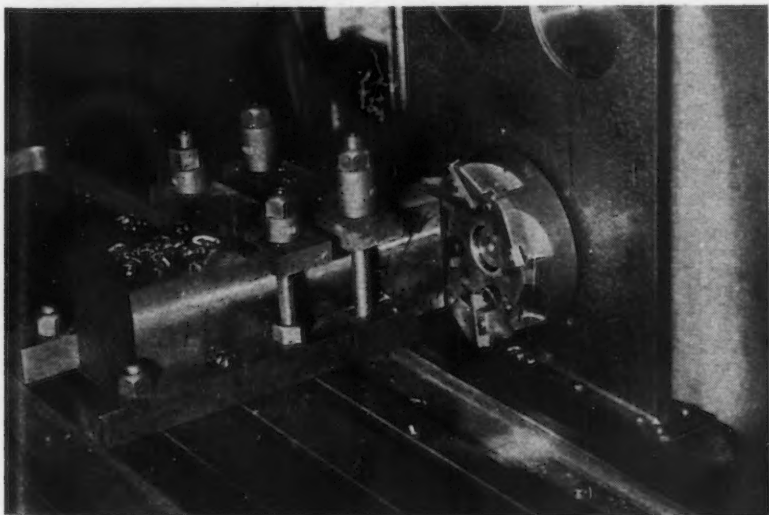
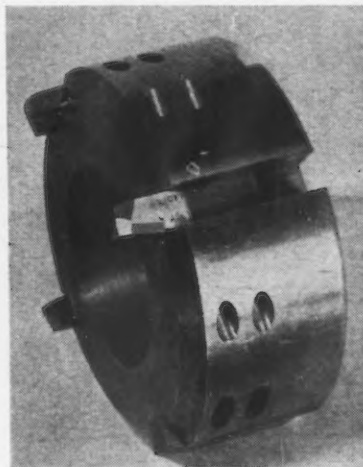


FIG. 41—When adequate power is not available, a step mill such as shown here may be used. This is a 6-in. diam cutter and has four blades, each cutting at a different diameter.



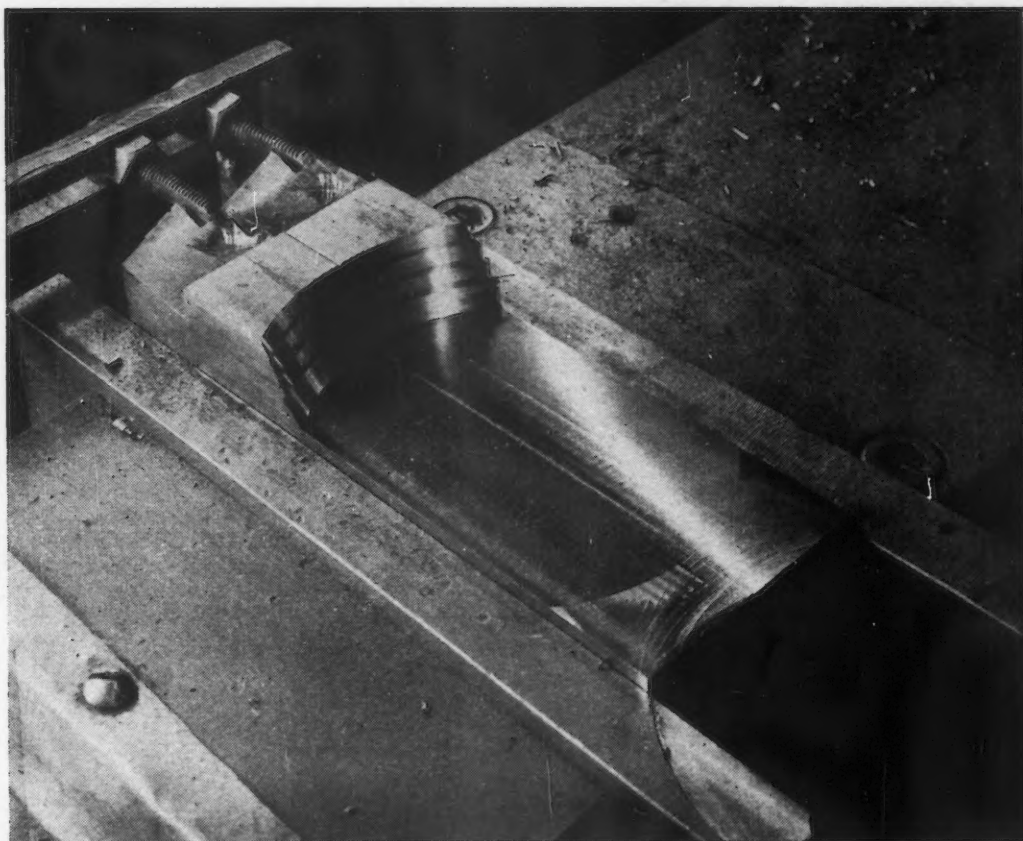


FIG. 42—Type of cut produced by the step cutter shown in fig. 41. Note that as the diameter of the steps decrease, the depth of cut increases correspondingly.

place by means of a wedge and Allen screw. The body of this cutter is of SAE 4340, heat treated to 40 RC. The blade of solid carbide is set at an angle of 15° in the body positive to the radius and is therefore referred to as a 15° positive radial blade setting angle. This permits changing the cutting angle within wide limits with the least expenditure of effort.

The wedging angle of 7° is also, in this design, the axial rake angle and, as used, negative with regard to the axis. Thus, this cutting angle can likewise be changed within limits imposed by the mechanics of this design, that is, the axial cutting angle can be changed from a negative 7°, through 0°, to a positive 5° without other change except the grinding of this face.

All of the cutting and clearance angles of this cutter were ground in a grinding jig on a small surface grinder as shown in figs. 7 and 8 (part 1, Feb. 13). This technique of grinding, while of immense advantage in actual production in terms of reduced cutter reconditioning time, is also most advantageous in expediting an experimental program which is the center of this present discussion.

Fly Cutters

Only one attempt was made to conduct experimental runs with a fly cutter or with one blade inserted in the cutter body. The inducement to so take an experimental milling cut is a temptation that should be vigorously and consciously avoided. The results are entirely misleading both in themselves and in their translation into a multi-toothed cut or run.

The interrupted nature of the fly cut, at its aggravated worst in this technique, heightens the effect of

the impact blows on the carbide. The earlier deterioration of the single tooth leads to erroneous conclusions of machinability, particularly when translated in terms of a multi-toothed cutter. Thus one blade, set and acting as a fly cutter in a body such as is shown in fig. 39 cannot be used to give the results of 8 blades when set as shown for multi-toothed operation. In other words, multiplying the life of one blade by eight will result in a wholly erroneous idea of the life of the complete assembly.

The so-called step mill as shown in fig. 41 is of the brazed tip design having its blades set on different levels and in correspondingly different cutting circles. This technique of cutting, on different planes and in different circles, is presented in fig. 42. It is evident from an examination of this illustration that step No. 1 has the largest diameter and takes the least depth of cut. Step No. 2, while it has a smaller diameter, also takes a deeper cut, and so on for the remainder of the steps however many they may be—and this depends on the diameter of the cutter used. In practice it is of advantage to set the last step at about 0.050 in. depth for finishing, and to divide the remainder of the depth of cut equally among the remaining steps.

General Discussion

The following types of stainless steel were used in this program: 303, 304, 416 and 420.

This report therefore, as regards conclusions on the machinability of these alloys may be divided into two parts: The first dealing with all stainless steels other than type 304, and the 18-8 stainless, which is referred to universally in the industry as type 304.

Stainless steels other than type 304, and as experi-

mented on in this research activity, represent quite fairly a cross-section of the machining properties of all other stainless steels. Type 304, however, is so radically different in its machining properties that it should be set apart and even considered as something other than steel.

The considerable amount of time expended on this effort is justified by the success achieved in the milling of type 304 stainless. So far as is known this material has never before been successfully milled at feed and speed rates that could be considered typical production procedure, or certainly economical. In fact, this has been quite generally true of all stainless steels until this new technique of carbide milling was applied. But the successful milling of type 304 at a surface foot rate of approximately 1000 fpm and a feed rate varying from 30 to 60 ipm places this hitherto difficult to machine material in a high machinability bracket.

Clearance Angles Critical

With little or no experience as a guide, much effort was expended in arriving at a solution of the problem of economical milling type 304. Various cutting angles were tried during these experimental passes, ranging from 0° radial rake and 0° axial rake to 10° positive radial rake and 5° positive axial rake. This obviously is based on the assumption that cutting angles are critical and have a definite influence on the machinability. This, however, is an entirely unfounded assumption. Clearance angles alone are critical.

When poor machinability is charged against type 304, it is generally attributed to its sticky nature. Specifically, this difficulty appears as a tendency to weld to the cutter body (in the worst instances) or at least to build up on the blade. In consequence, it is impossible to obtain good finishes in terms of mirror-like finishes. Scratching and clouding of the surface due to poor chip ejection or faulty chip removal placed this stainless steel in a low machinability bracket.

When, however, the critical nature of the clearance angles became apparent and the proper clearance angles were ground into the blades, this type of stainless steel appeared with a very high machinability characteristic.

As indicated previously, all stainless, other than type 304, can be treated exactly as straight carbon steels, and surface foot rates for their milling can be chosen on the basis of the Brinell hardness number.

Recommendations for Milling Stainless Type 304

- (1) Use surface foot rates ranging from 900 to 1100.
- (2) Use standard steel cutting angles, namely, 7° negative radial rake and 7° negative axial rake and 15° nose angle.
- (3) Do not change the axial rake from negative to 0° or positive.

(4) A 15° nose angle gives satisfactory results. A 45° nose angle has definite disadvantages: Chips are curled into the workpiece face marring its finish and increasing the abrasion effect on the carbide.

Previous articles in this series covering carbide milling were as follows:

Part No.	Subject	Issue Date
1.	Fundamentals of carbide milling	Feb. 13, 1947
2.	Low carbon steel and wrought iron	Feb. 20, 1947
3.	Straight carbon and cast steel	Feb. 27, 1947
4.	Heat-treated steels	Mar. 6, 1947
5.	Armor plate, heat-treated alloy steel, stress proof steel, die plates	Mar. 13, 1947

(5) Use a 0° to 15° face relief angle on the blade to prevent marring of surfaces and to provide sufficient chip clearance space. A 7° relief angle on the OD is also a definite part of this recommendation concerning clearance angles which are to be construed, according to this interpretation, as extremely critical. That is, it is impossible to deviate from the 15° face clearance angle appreciably without incurring failure in the milling operation. It is not advisable, on the other hand, to increase the clearance angle beyond 15° since the resultant weakening of the carbide blade at that point leads to premature chipping of the face cutting edge.

(6) High, rather than low, chip loads should be used. Specifically, this means from 0.006 to 0.010 in.

(7) Good chip ejection is a function of the chip load and the depth of cut. The following table is recommended:

For depth of 0.075 in., use 0.010 in. chip load
For depth of 0.150 in., use 0.0075 in. chip load
For depth of 0.175 in., use 0.006 in. chip load

(8) These recommendations refer to a universal face mill. If a step mill is applied to milling stainless, use a step mill having 0° radial rake and 0° axial rake with a 30° nose angle and with chip loads as high as 0.030 in. This application can be made when a sufficient amount of power is not available for a multi-toothed cut.

For the milling of stainless steels other than type 304, the following recommendations are made:

- (1) Use surface foot rates as in steels based on Brinell hardness numbers.
- (2) If the cutter life is not a prime consideration, a higher surface foot rate, as high as 1000, can be used.
- (3) Face dish angle of 0° and clearance angle of 7° is important for finish.
- (4) Step mill applications can be made as for straight carbon steels.

Part 7 of this series on carbide milling will appear in the next issue.—Ed.

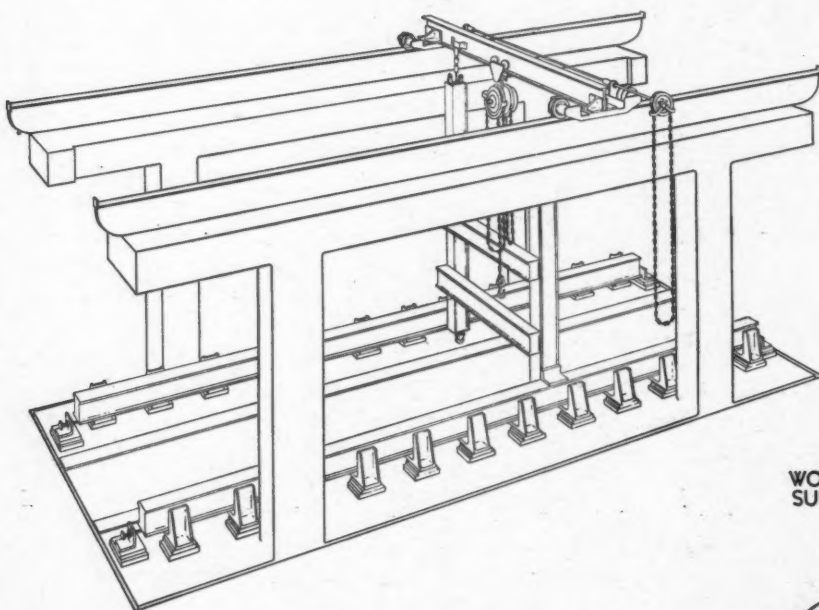
Tooling Dock Simplifies

By LELAND A. BRYANT

Consultant,
Beverly Hills, Calif.

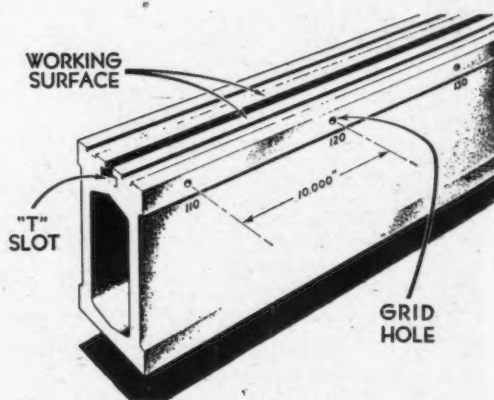
MANUFACTURERS of complex metal assemblies have long recognized that the only really efficient way to mass produce these parts is by utilizing line production techniques wherein the product is broken down into numerous relatively small components that can be prefabricated by semiskilled factory workers, and then as-

sembled in a series of simple mating operations. Under this scheme, the increased efficiency results from the combination of specialization of labor operations, greater working convenience through individual work area separation, and more expedient production control and parts supply through production line stationizing.



LEFT
FIG. 1—General appearance of the tooling dock showing the arrangement of the longitudinal, vertical and transverse straightedges by means of which any point in space may be accurately located.

BELOW
FIG. 2—Section of a longitudinal straightedge showing the various features common to all straightedges.



sembled in a series of simple mating operations. Under this scheme, the increased efficiency results from the combination of specialization of labor operations, greater working convenience through individual work area separation, and more expedient production control and parts supply through production line stationizing.

The prerequisite to an effective breakdown for line production is the establishment of component interchangeability through rapid, low cost, precise assembly tooling. In many cases, however, and particularly where very large units such as railroad cars, aircraft, ships, and buses are concerned, such precision tooling has not heretofore been available. It was to overcome this assembly problem that the master tooling dock was designed by the author and developed into its final form by Consolidated Vultee Aircraft Corp.

Classic assembly tooling methods involve the

manipulation of a wide variety of precision measurement devices such as surface plates, angle blocks, height gages, micrometers, dial indicators, transits, scales, piano wire, and precision boring machines such as boring mills and jig borers. None of these, however, provides mastery of the third dimension except over very small precision ranges; hence, prior to the creation of the master tooling dock, precision tooling for interchangeability was limited to relatively small mechanisms and structures.

During the war, the necessity for mass production of such large complex structures as aircraft revealed the critical need for improved assembly methods, due to the large number of parts involved, the complexity of the sweeping contours, and the close tolerance required in the mating of parts. Only in the fabrica-

Building Assembly Fixtures

produce a limited number of relatively large assembly fixtures in which the major parts of an airplane could be assembled as units.

In using such methods, efficiency was further sacrificed to expediency. Only a limited number of production workers could work in each assembly fixture, and each one had to be craftsman and contortionist combined, hand fitting, cutting, drilling, and riveting while squeezing into tight spots in the fixture. It was difficult to train and use semiskilled or physically handicapped persons under such conditions, which, in themselves violate the first principle of efficient manufacture; namely, effective employment of labor requires that the skill involved in each operation be reduced to a minimum.

The basic design of the tooling dock, shown in outline in fig. 1, consists essentially of a three-dimensional positioning device that establishes a complete system of dimensionally accurate reference lines and planes upon which the positioning of the critical members of an assembly fixture is based. It is capable of precisely locating points in space and transferring those points to an assembly fixture, and by its use it is said to be almost as easy to precisely locate a point in space as it is to locate the center of a sheet of paper with diagonal lines from corner to corner.

The key elements are three sets of physical members called straightedges. Fixed longitudinal straightedges represent length, movable vertical straightedges represent height, and movable transverse straightedges represent width. The straightedges, therefore, define the boundaries of a geometrical parallelepiped in which all angles are 90 deg. This simple geometrical solid determines the limits of a three-dimensional envelope, the working bay in

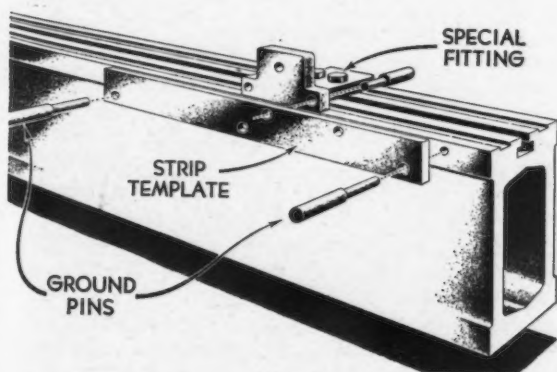
Applicable to a wide variety of large structures such as automobiles, aircraft and railroad cars, a master tooling dock for the construction of assembly fixtures is described herein. By means of longitudinal, vertical and transverse straightedges, any point in space can be accurately located without the use of conventional measuring instruments, and any number of exactly similar fixtures may be constructed without danger of human error or accumulation of tolerances.

which any point in space can be precisely located and fixed.

The straightedges themselves, as shown in fig. 2, are equipped with ribbed working surfaces accurately machined and ground for smoothness. A line of bushed 0.5-in. diam grid holes extends the full working length of each bar, evenly spaced at exactly 10.000 in. center to center, and numbered for reference. These holes establish the system of reference lines and planes used as the basis for all positioning. Machining limitations made it advisable to limit the length of individual straightedges to not more than 10 ft, but these may be combined in any number desired to suit the project in hand, and an 80-ft dock is in use at Consolidated's Fort Worth division.

Rigidity is, of course, of the utmost importance, and the foundation and superstructure of the dock form an integral, rigid mass of reinforced concrete capable of resisting earth movements caused by tide changes and vibrations due to earth tremors, drop hammers, and other heavy equipment. The foundation is a thick, heavily reinforced concrete block supported, when necessary, by steel pilings, and isolated from the building floor by a 2-in. felt cushion. The superstructure consists of four or more reinforced concrete columns and two reinforced concrete lintels.

The tooling dock is a physical embodiment of the three basic reference planes used in drafting. The horizontal and frontal planes are established by the

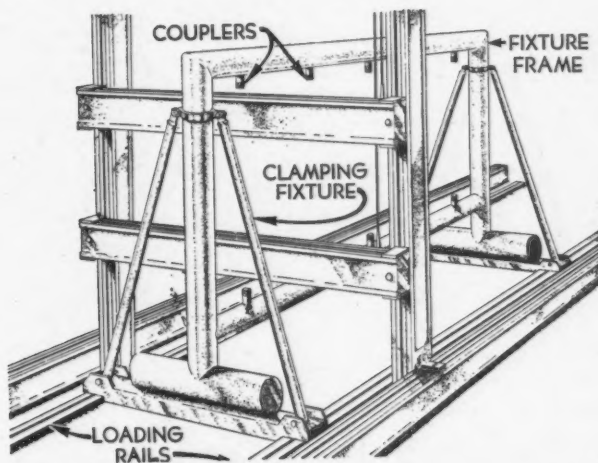


ABOVE

FIG. 3—Strip templates are attached to the straightedges by ground pins. Special fittings are located by jig-bored holes in the strip and secured by T bolts.

RIGHT

FIG. 4—The basic frame of the fixture is mounted in the tooling dock by means of a suitably designed clamping fixture securely bolted to the loading rails.



Tooling Dock Simplifies

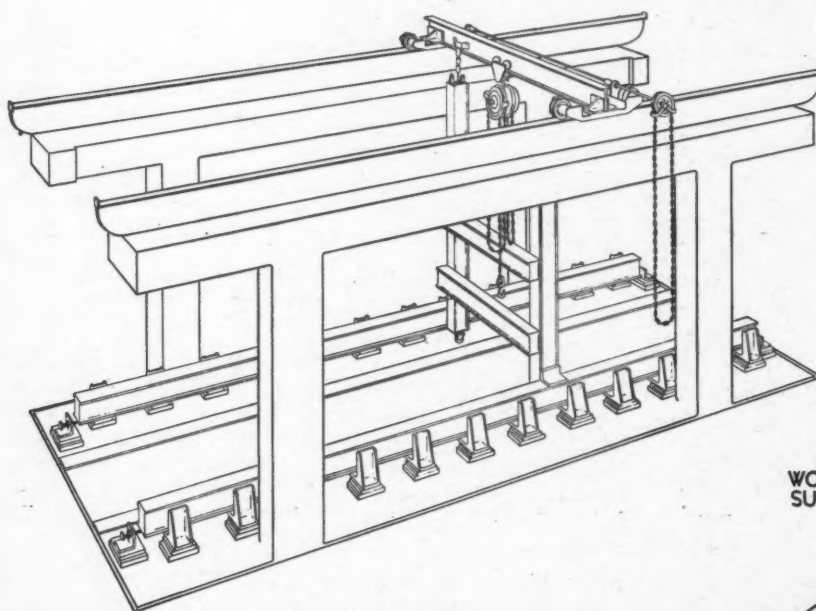
By LELAND A. BRYANT

Consultant,
Beverly Hills, Calif.

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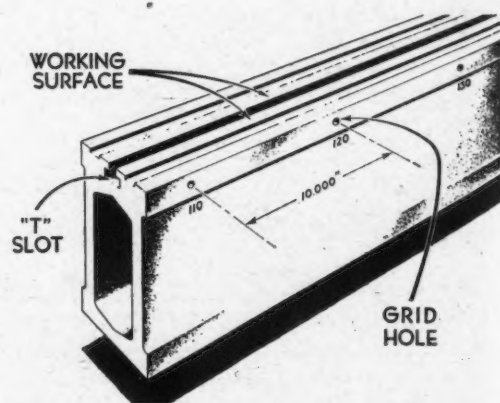


LEFT

FIG. 1—General appearance of the tooling dock showing the arrangement of the longitudinal, vertical and transverse straightedges by means of which any point in space may be accurately located.

BELOW

FIG. 2—Section of a longitudinal straightedge showing the various features common to all straightedges.



sembled in a series of simple mating operations. Under this scheme, the increased efficiency results from the combination of specialization of labor operations, greater working convenience through individual work area separation, and more expedient production control and parts supply through production line stationizing.

The prerequisite to an effective breakdown for line production is the establishment of component interchangeability through rapid, low cost, precise assembly tooling. In many cases, however, and particularly where very large units such as railroad cars, aircraft, ships, and buses are concerned, such precision tooling has not heretofore been available. It was to overcome this assembly problem that the master tooling dock was designed by the author and developed into its final form by Consolidated Vultee Aircraft Corp.

Classic assembly tooling methods involve the

tion of relatively small parts was it possible to draw upon the conventional techniques used in other metalworking industries. Because inadequate assembly tooling methods made it economically infeasible to fabricate the large number of small assembly fixtures necessitated by an efficient manufacturing breakdown, and because those same tooling methods could not provide the precise coordination control which such a manufacturing program requires, aircraft manufacturers had no alternative but to fabricate costly dummy master gages from which to

Building Assembly Fixtures

produce a limited number of relatively large assembly fixtures in which the major parts of an airplane could be assembled as units.

In using such methods, efficiency was further sacrificed to expediency. Only a limited number of production workers could work in each assembly fixture, and each one had to be craftsman and contortionist combined, hand fitting, cutting, drilling, and riveting while squeezing into tight spots in the fixture. It was difficult to train and use semiskilled or physically handicapped persons under such conditions, which, in themselves violate the first principle of efficient manufacture; namely, effective employment of labor requires that the skill involved in each operation be reduced to a minimum.

The basic design of the tooling dock, shown in outline in fig. 1, consists essentially of a three-dimensional positioning device that establishes a complete system of dimensionally accurate reference lines and planes upon which the positioning of the critical members of an assembly fixture is based. It is capable of precisely locating points in space and transferring those points to an assembly fixture, and by its use it is said to be almost as easy to precisely locate a point in space as it is to locate the center of a sheet of paper with diagonal lines from corner to corner.

The key elements are three sets of physical members called straightedges. Fixed longitudinal straightedges represent length, movable vertical straightedges represent height, and movable transverse straightedges represent width. The straightedges, therefore, define the boundaries of a geometrical parallelepiped in which all angles are 90 deg. This simple geometrical solid determines the limits of a three-dimensional envelope, the working bay in

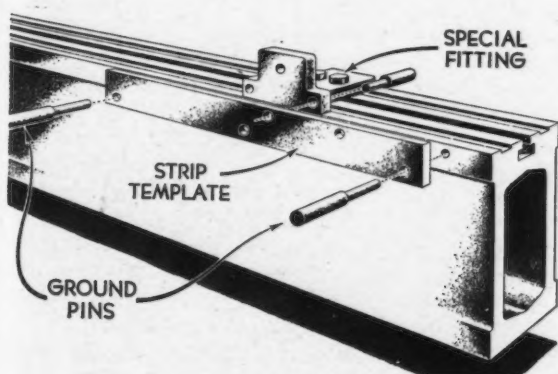
Applicable to a wide variety of large structures such as automobiles, aircraft and railroad cars, a master tooling dock for the construction of assembly fixtures is described herein. By means of longitudinal, vertical and transverse straightedges, any point in space can be accurately located without the use of conventional measuring instruments, and any number of exactly similar fixtures may be constructed without danger of human error or accumulation of tolerances.

which any point in space can be precisely located and fixed.

The straightedges themselves, as shown in fig. 2, are equipped with ribbed working surfaces accurately machined and ground for smoothness. A line of bushed 0.5-in. diam grid holes extends the full working length of each bar, evenly spaced at exactly 10.000 in. center to center, and numbered for reference. These holes establish the system of reference lines and planes used as the basis for all positioning. Machining limitations made it advisable to limit the length of individual straightedges to not more than 10 ft, but these may be combined in any number desired to suit the project in hand, and an 80-ft dock is in use at Consolidated's Fort Worth division.

Rigidity is, of course, of the utmost importance, and the foundation and superstructure of the dock form an integral, rigid mass of reinforced concrete capable of resisting earth movements caused by tide changes and vibrations due to earth tremors, drop hammers, and other heavy equipment. The foundation is a thick, heavily reinforced concrete block supported, when necessary, by steel pilings, and isolated from the building floor by a 2-in. felt cushion. The superstructure consists of four or more reinforced concrete columns and two reinforced concrete lintels.

The tooling dock is a physical embodiment of the three basic reference planes used in drafting. The horizontal and frontal planes are established by the

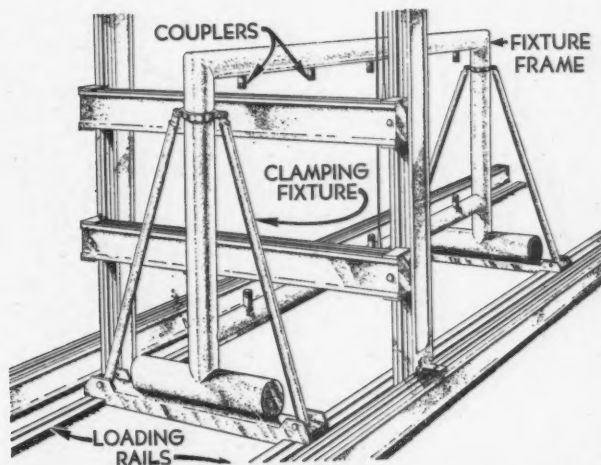


ABOVE

FIG. 3—Strip templates are attached to the straightedges by ground pins. Special fittings are located by jig-bored holes in the strip and secured by T bolts.

RIGHT

FIG. 4—The basic frame of the fixture is mounted in the tooling dock by means of a suitably designed clamping fixture securely bolted to the loading rails.



longitudinal straightedges, the profile plane by the vertical, adjustable straightedges. In any selected profile plane, the transverse straightedges operate similar to the straightedge used on a drafting board. Precise linear measurements in each of the three basic planes are made possible by reference to the grid holes through the medium of special strip templates. These consist of $\frac{3}{8}$ x 2-in. steel strips having jig drilled 0.5-in. holes spaced at 10.000-in. centers to match the holes in the straightedges and are attached by means of ground pins as shown in fig. 3. Along the opposite edge of each strip template are jig-bored holes 0.5-in. diam, each of which defines one of the

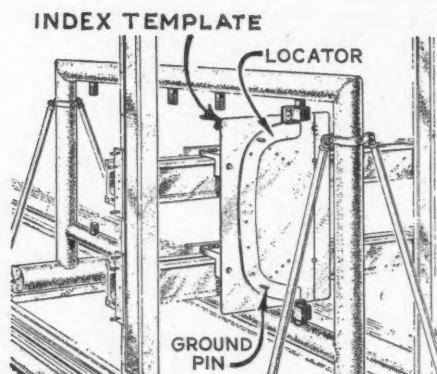


FIG. 5—The previously fabricated locator is positioned on the index template by inserting ground pins through corresponding tooling holes in the locator and the index template.

three engineering stipulated dimensions of a point in space. All the strip templates required in tooling a product represent a complete set of nonvarying master gages for that product and assure positive, automatic coordination of interrelated components. By this means any accumulation of tolerances is prevented, since each of the basic dimensions is pre-established directly from the engineering drawing as a tooling hole in a strip template. Once such a hole has been established it cannot vary; hence, all of the former painstaking effort to hold tolerances is eliminated.

Building a Fixture

All the elements necessary for positioning the critical members of an assembly fixture are prepared in advance. Hence, construction of an assembly fixture becomes a final assembly operation consisting of a series of simple manipulations in which no free-hand measurements are involved. The frame itself, as shown in fig. 4, is fixed in position and supported by a clamping fixture bolted securely to the loading rails. In this particular example the completed fixture will be used for assembly of aircraft fuselage skin and stringer units. To set up the master dock the proper strip template is mounted on the longitudinal straightedge with ground pins. A special dock fitting is then positioned, as shown in fig. 3, by inserting a locating pin through the fitting and the proper hole in the template, after which the fitting is secured by T bolts and the template removed. The vertical straightedge is next positioned and bolted to the special fitting. This is done on both sides. The transverse straightedges are then located by means of strip templates pinned to the vertical members and are fixed by T bolts. To locate the actual tool-

ing point, strip templates are mounted on the transverse straightedges in a specified position, and special index fittings positioned to these and attached by T bolts.

When locators are required to maintain contours at successive planes through a body, tooling holes are utilized for each plane. A special index template is prepared from the body plan, and upon it the tooling holes for each successive station are nested in the same sense that the contours for each successive station are nested on the loft or body plan. This index template, shown in fig. 5, is positioned on the index fittings by means of ground bolts passing through reamed holes in the template into reamed and tapped holes in the index fittings. The previously fabricated locator is positioned on the index template by inserting ground pins through corresponding tooling holes in the locator and the index template.

Roughly grooved steel bars or couplers, previously welded to the frame in the approximate longitudinal positions, will now fit loosely into small pots which form a part of the locators. These pots are also roughly grooved. To secure the locators in position,

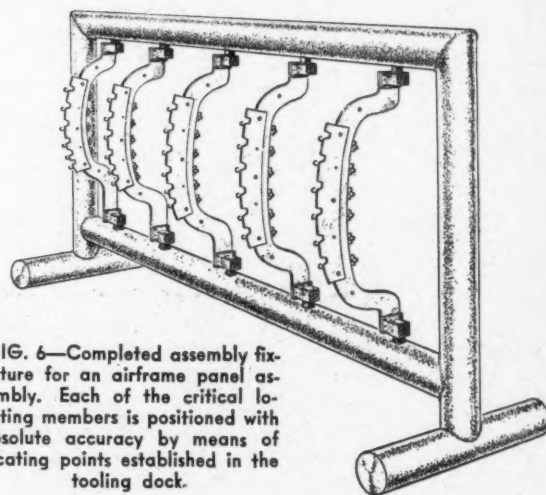


FIG. 6—Completed assembly fixture for an airframe panel assembly. Each of the critical locating members is positioned with absolute accuracy by means of locating points established in the tooling dock.

Cerrmatrix or Prestalloy is poured into each pot, and since this expands slightly on cooling, a very tight joint results. Steel dowels are then employed to complete the anchorage.

When the first locator has thus been positioned, it is not necessary to repeat all the above operations to complete the fixture. The index template contains all the tooling holes required for positioning each of the successive locators, hence the transverse straightedges are already positioned for each subsequent operation. To complete the fixture, the vertical straightedges are successively positioned at each predetermined station on the longitudinal straightedges, and the locators are positioned and securely fixed at each successive station. All operations are performed in rapid succession, and the assembly fixture can be completed in a few hours.

The completed fixture, shown in fig. 6, is typical of an airframe fuselage panel assembly fixture, and as many of these as may be required for assembly in the same or in widely separated plants may be made up with the absolute assurance that each will be exactly the same as the preceding one. The technique used will vary slightly for each type of fixture, but the fundamental plan will remain unchanged.

Welded Design Simplifies Motor Construction

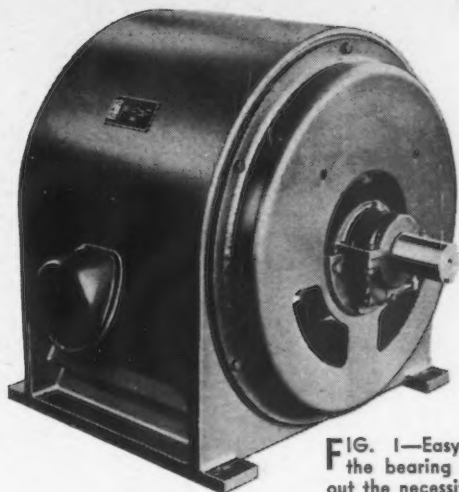


FIG. 1—Easy access to the bearing sleeve without the necessity of removing a heavy half-bracket is made possible by the unusual design of this motor end shield.

USE of welding in the manufacture of electric motors and generators is not new, although designing and manufacturing engineers are continually finding new ways of applying this very useful process. A line of moderate sized welded steel squirrel-cage motors recently developed by Elliott Co., Jeanette, Pa., illustrates one such application along with some novel manufacturing techniques. The sizes included in this line are from 150 to 1000 hp, four poles, with corresponding ratings for other numbers of poles.

Some of the problems presented to the designer in developing motors in these sizes are the following: (1) Standard enclosures, such as drip-proof, splash-proof, forced-ventilated, must be available; (2) both split-type sleeve bearings and ball or roller bearings are required; (3) a variety of core widths for each diameter as well as special mounting dimensions must be readily obtainable without excessive tool and fixture cost, and (4) appearance is important, with clean lines and modern styling desirable.

A unique feature is the bearing bracket or end shield design, fig. 1, which makes use of a solid flanged head as the basic shape with the bearing assembly as a separate insert. From the user's point of view this arrangement makes inspection and replacement of sleeve bearings relatively easy. Instead of having to unbolt and lift off a heavy half-bracket, the maintenance man simply removes a light bearing cap.

From the manufacturer's standpoint there are a number of advantages. First, with the bearing housing separated from the supporting bracket, machining becomes much simpler than for conventional split brackets. The housing itself, which is the more intricate part of the structure, is handled on a turret-lathe, a small milling machine and a drill press. The

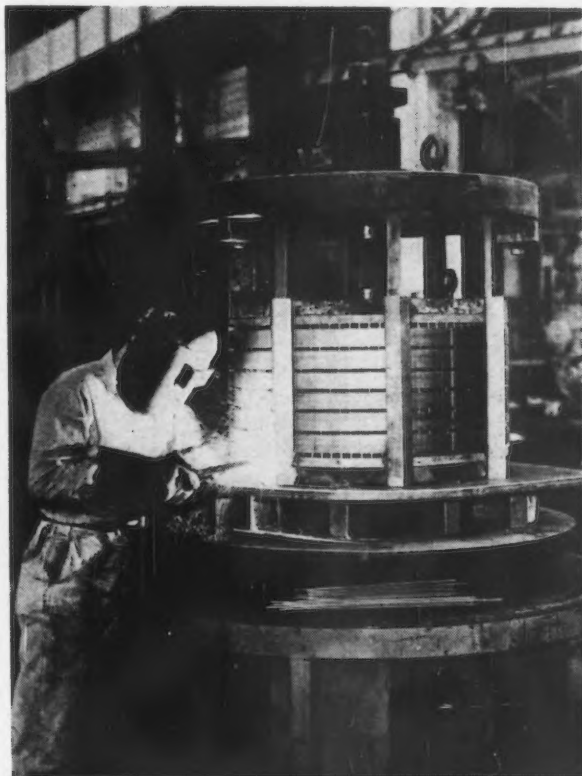
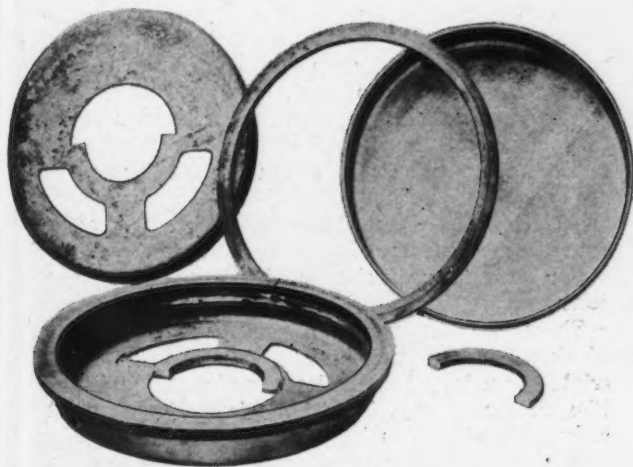
RIGHT

FIG. 3—Squirrel-cage stator under construction. Punchings are secured by angles welded to the end plates.

o o o

BELOW

FIG. 2—Sleeve bearing bracket is cut from a flanged head to which an edge-rolled ring is welded to form a bolting flange. Additional reinforcement is added for the bearing housing seat.



large diameter piece, the bracket proper, requires the use of a vertical boring mill, but there are only two simple boring and facing operations plus some drilling and tapping in one plane. The elimination of the operations of milling the parting surfaces, turning the bearing seat and drilling and tapping holes at various angles in a large heavy structure is a decided manufacturing advantage.

The bracket proper, starts as a flanged head, one of the present day available shapes, to which an edge-rolled ring is welded to form a bolting flange as shown in fig. 2. Openings as required for ventilation and for insertion of the bearing housing are flame-cut in the head and an additional bearing support is welded in place. The resulting structure is rigid but light in weight.

The stator member contains some novel features. There is no frame in the usual sense, but instead a supporting structure is built around the punchings. A building mandrel is first set up and the punchings are stacked over slot keys and pressed between end plates by hydraulic pressure. The cross members, consisting of steel angles, are then welded to the end plates, as shown in fig. 3, to lock the core in place. At two or more points the weld is carried across the back of the punchings to act as a key against circumferential movement.

The frame plates are then welded to the ends of the angles in such a position as to give proper ventilating space around the core. Feet are positioned in the building fixture, welded in place and a heavy wrapper plate is then applied.

It was found that modern flame cutting technique was sufficiently accurate to cut the core end-plates and frame plates from rolled plate stock without the need for any machining before assembly. The end plates are taken from the centers of the frame plates, thus ef-

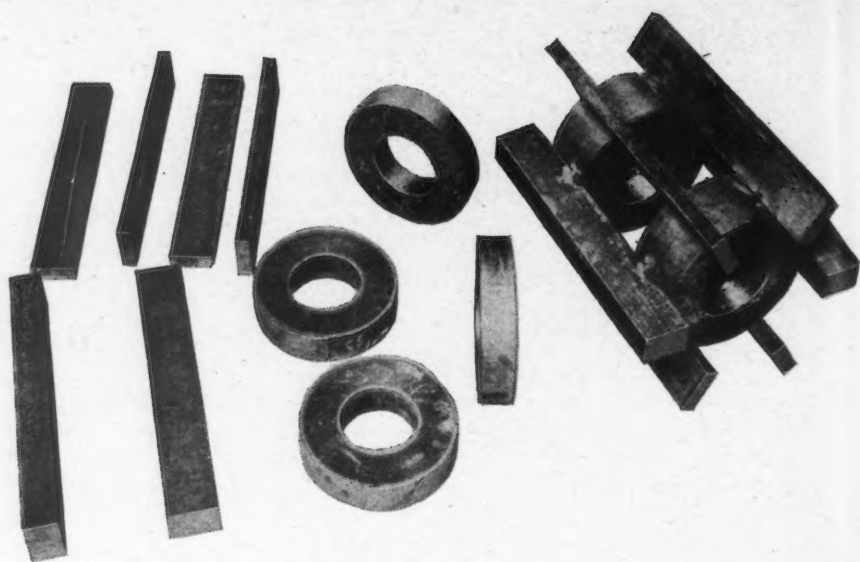


FIG. 4—Rotor spiders are fabricated from flame-cut rings and bar stock.

fecting a considerable reduction in scrap losses.

After the stator is completely stacked and welded it is stripped from the building fixture and placed on a similar but somewhat simpler fixture for machining the bracket fits. This fixture has a pilot fit which engages the center of the boring mill table and insures accurate concentricity between the inner diameter of the stator punchings and the bracket fit. With the small air gaps required in squirrel-cage motors such attention to concentricity of parts is essential.

For certain sizes and speeds of motors a fabricated steel spider is used. This is built up from simple flame-cut rings of heavy plate and lengths of bar stock as shown in fig. 4. Rotor clamping plates are flame-cut and welded in place on the spider. Phos-copper welding is used to join the rotor bars and end-rings.

The final result is a motor which can be adapted to the various requirements of the industrial field with a minimum of engineering and tooling changes. It has adequate enclosures, is light weight but rigid and has the clean lines and smooth appearance which is characteristic of modern machinery design.

Lathe Construction Revealed in Transvision Book

TO the experienced machine tool buyer, the external appearance of a machine is of decidedly secondary importance. What really matters is the construction of the working elements which can be seen only by stripping the machine or by observing assembly operations in the maker's shop. Since neither of these steps are very practicable for the average man, R. K. LeBlond Machine Tool Co., Cincinnati, has made it possible for the prospective lathe buyer to examine their Dual Drive Lathe inside and out, without even getting out of his chair.

This is done by means of a new Transvision book containing ten pages printed on transparent plastic. The first page shows the complete lathe as seen from the outside. Turning this page has the effect of removing the headstock and gear box cover and revealing, in five colors, what could be seen if these parts were removed from an actual machine. On the facing page

the inside of the cover becomes visible. Major parts are numbered for identification on a table in the lower right hand corner of each page, while a color chart indicates the purpose of the various elements.

Turning the next page reveals a cutaway section through the center line of the headstock, and makes visible parts which could be seen only during an assembly operation. At the same time the cross slide and compound rest is partly disassembled. Successive pages bring into view, from both front and rear, all the major elements until the machine is virtually stripped down.

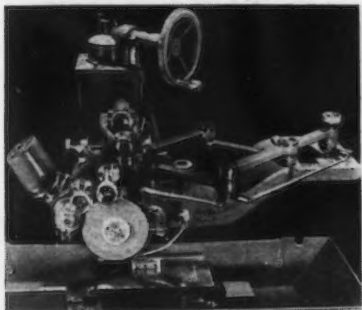
The book is expected to have application in the field of education, and should prove of great value in industrial apprentice schools, colleges and vocational schools. The supply of this book is strictly limited, and in order to confine distribution to those who are directly interested, a price of \$1 per copy has been established.

New Equipment...

Small Tools and Gages

New developments in grinding wheels, dressers, vertical milling attachments, double diameter chasers, boring tools and bars, live centers, various chucks and tool holders, vises and clamps are described in this week's issue which also includes numerous inspection and snap gages, a roll thread comparator and concentricity checker.

1 Pantographic diamond form wheel dressing and roll crushing have been combined in a single machine, the Panto-Crush wheel dresser, developed by *Moore Special Tool Co.*, Bridgeport, Conn. The 2-in-1 wheel dresser consists of a high-precision pantograph, working directly from a template plus a power-driven roll crusher, both mounted together and always accurately related to the spindle. The combination is said to result in a degree of ultimate precision and economy in form grinding unobtainable by either method used alone or by both treated as independent units. The principles em-



bodied in this device may be employed, within reasonable limits, on any type of grinder, either cylindrical or surface, on a wide variety of circular or linear form grinding. Either wheel dressing method, or both, may be employed to suit the particular job to be done; roll-crushing for fast, cool grinding and diamond dressing for fidelity of form and fine finish. Switching from one method to the other can be done without disturbing the workpiece setting or the location of either truing device.

Grinding Wheels

2 V-Eight grinding wheels said to be similar in structure to porous wheels but to hold their corners even under extremely heavy cuts and to perform efficiently in dish and cup shapes, have been

announced by *American Emery Wheel Works*, Richmond Sq., Providence, R. I. Structure gives maximum air cooling for dry grinding and the open cells carry extra coolant when wet grinding. More metal is removed in less time and the wheel face is maintained with less dressing, it is reported.

Abrasive Wheels

3 Bayflex raised hub disk wheels, manufactured by *Bay State Abrasive Products Co.*, Westboro, Mass. represent a new type of abrasive wheel, having a wide application, especially in the field of welded or brazed metals, in foundries, sheet metal shops, automobile repair shops and welding shops. They are said to be valuable also in grinding aluminum castings. The edge can be used for grinding and even cutting off and disks can be used efficiently right down to the nut, it is reported. Under normal circumstances these wheels are not subject to loading, but when they are with lead or paint, they can be cleaned quickly by touching the face on a concrete floor. Wheels will fit any standard machine formerly employing coated disks, and are available in the same grit size.

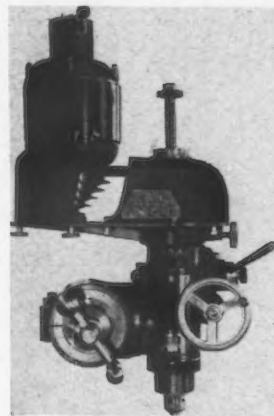
Grinding Wheels

4 All-purpose grinding wheels which will grind any kind of material, including tool steels, stainless, Monel, bronze, aluminum, brass and hard plastics, have been announced by *DoAll Co.*, 1301 Washington Ave. S., Minneapolis 4. The wheels are said to work equally well for heavy, fast roughing cuts and fine finishing, producing a precision finish comparable to that of a 300 grit wheel, and can be used on surface, centerless, cylindrical, tool grinders. No alteration to the machine is necessary and the cutting rate is limited only by the ability of the grinding machine. The bond used in making the wheels is insoluble and prevents

them from weakening from use of coolants in wet grinding, yet their open structure is such that work remains cool even when dry grinding. Wheels are available in types No. 1, straight; No. 5, recessed side and No. 7, recessed two sides. Sizes range from 1 to 14 in. in diam x 1/4 to 3 in. in thickness.

Vertical Milling Attachments

5 Improvements in the Fray all-angle vertical milling attachments have been announced by the *H. Leach Machinery Co.*, Providence, R. I. Type 1 milling attach-



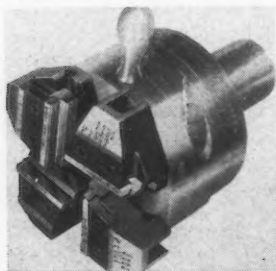
ment has been equipped with a 3/4 hp heavy duty motor to bring its working ability up to Types 2 and 3. All three retain spindle speeds from 375 to 5200 rpm but Type 3 is available with back gearing, providing two additional low speeds of 125 and 250 rpm. Type 4 all-angle milling attachment is a heavier unit, designed for use on No. 2 and heavier milling machines, engine lathes, planers, boring mills, etc. It is powered with a 1 1/2 hp motor. The spindle has been redesigned to No. 30 National Standard taper. The speed range, too, has been changed to include 6 open belt spindle speeds from 375 to 5200 rpm and, in addition, this unit is equipped with two back-gear speeds of 125 and 250 rpm.

Milling Cutters

6 Development of a line of standard carbide tipped cutters in the plain, side, half side, shell and face mill forms has been announced by *Super Tool Co.*, 21650 Hoover Rd., Detroit 13. These cutters, available in all standard sizes, are designed specifically for milling cast iron.

Double Diameter Chasers

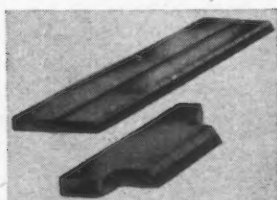
7 Having all surfaces and the thread form ground after hardening and guaranteed to hold with-



in a class three fit on the two diameters, a double diameter tangential type ground thread chaser has been developed by *Landis Machine Co.*, Waynesboro, Pa. It is essential that the threads produced on the two diameters be of the same form and pitch. There are limitations in the difference between the two diameters for which the chasers can be furnished and each set of chasers must be engineered for the threading job on which it will be used. Both diameters of threads on the workpiece should be a short length to satisfactorily use the double diameter chaser.

Work Rest Blade

8 To overcome the high cost of replacing chipped solid strip work rest blades, *Scully-Jones &*



Co., 1901 S. Rockwell St., Chicago, has created a carbide-tipped work rest blade which is segmented. Damage to one or more of the segments does not require the blade to be scrapped; it can be returned to the factory for replacement of the segment. Segment slots are self-clearing, being so designed that

metal chips and grit are carried away by the circulation of the coolant. The slots are said not to mar or score the softest metals.

Rough Boring Tool

9 Adaptable to both production and jobbing shop operations, a rough boring tool has been an-



nounced by the *Madison Mfg. Co.*, Muskegon, Mich. A block type tool, it differs from conventional types in that the cutting blades are not inserted into a block; the blades themselves form the cutting block. Chief advantages of the tool are quick changing of cutters, adjustment of cutter size before mounting in bar and positive centering of cutter in bar. The Madison locating feature automatically centers the cutter, equalizing the load on the cutting elements. A single micrometer thread screw expands both blades equally from the centering slot on the blades themselves.

Live Centers

10 Hi live centers which incorporate proven engineering precision and design to handle heavier loads at the higher speeds have been announced by *Holub Industries, Inc.*, Sycamore, Ill. They are equipped with matched and pre-



loaded precision quality Timken bearings, the two bearings being matched in pairs with eccentricity points lined up which prevents fighting and they are preloaded by means of the threaded adjusting ring. This design is said to assure extreme accuracy; eccentricity or runout of point is held to 0.0002 in., both free and under load. Hi live centers are not only capable of high speeds but assure high load carrying capacity up to 1000 lb in the No. 2 and 3 Morse taper sizes and up to 2400 lb in the No. 4 and 5 Morse taper sizes. Another improvement is a heavy duty grease seal which resists wear from metal chips and prevents the entrance of foreign matter.

Small Air Drills

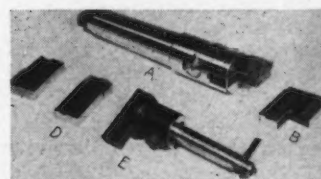
11 Two small air drills, the midget type M-850 and the E-O M-1100 have been announced by *Rotor Tool Co.*, 17325 Euclid Ave., Cleveland 12. The Midget has capacity of 1/16, 1/8 and 3/16 in. drilling and light screw driving and nut setting with speeds of 1000, 2000, 4000 and 20,000 rpm. It is small, light and compact. The second model, illustrated, has capacity of 1/4, 5/16 and 3/8 in. drilling nuts and hex head machine screws in carbon steel. It has ample power for high speed drilling. Speeds are 1050, 1500, 2000 and 3000 rpm. The drill is equipped with spade handle only or spade handle and auxiliary side handle for firm control. Both types are available with



rotor double adjustable clutches. The torque of the air motor drives the nut down, then the triple action clutch gives three impacts per revolution setting the nut or screw to a predetermined tension.

Boring Bars

12 Announcement of boring bars with tapered shank and instant-change blades has been made by *Behr Products Co.*, 13732 Woodward Ave., Detroit 3. Cuts up to 3/4 in. on a side are taken with this tool without chatter, it is said. A standard facing or shoulder boring blade cuts flat and square with the spindle axis. Back facing or in-



verted boring blades and single end cutting fly tool blades are also available. A double end cutting blade used for roughing and finishing in one pass over the work is also available in 3, 5 and 7 in. sweeps. A small hole adapter bores holes smaller than 2 in. in diam. Models 1500 having a 2-in. diam head have a boring range up to 6

in. diam; Models 1501 with 3½ in. head diam has a range up to 12 in. diam.

Machine Centers

13 Machine center sets consisting of a single shank and an assortment of six noses which thread into the shank have been announced by the *Black Drill Co.*, 1400 East 222nd St., Cleveland 17. Once the shank is placed in the spindle of



the head or tail stock, noses can be changed to suit the requirements of the work without removing the shank. Noses are made of the finest high-speed steel heat treated to 65 Rc. Centers are made in complete range of sizes No. 2 to No. 12 for lathes and grinders, with Morse, Brown and Sharp and Jarno tapers and with straight shanks for screw machines.

Revolving Tip Center

14 Known as the Evco revolving tip, a live lathe center with the same dimensions as standard solid centers has been announced by *E. H. Vanderwall Co.*, 440 Golden Gate Ave., San Francisco. A hardened steel center spindle revolves within the steel taper shank, with long bearing surface. Thrust is taken by a replaceable steel ball and thrust plate. The thrust end of the spindle is slotted and spring tempered to yield slightly under load. Revolving tip centers are available in three sizes, No. 2 Morse taper shank, No. 3 and No. 4 shank.

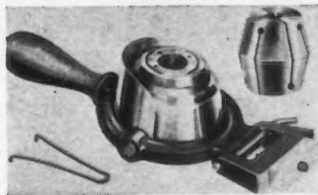
Expanding Reamers

15 Featuring full-length carbide cutting edges to permit precise reaming operations at high speeds, a line of heavy duty solid shank and shell type expanding reamers has been announced by *Metro Tool & Gage Co.*, 4240 W. Peterson Ave., Chicago 30. These reamers, available also in blades with high speed steel, are designed with a low expansion angle to lessen the OD

grinding when sharpening and have a 1/16-in. blade overhang to increase rigidity without loss of chip clearance, permitting extra long reamer blade life, it is claimed. Chrome plated and precision made of high grade heat-treated alloy, these reamers are available in cutting diameters of from 1 to 6 in. Shell arbors are furnished with straight or Morse taper shanks.

Collet Chuck

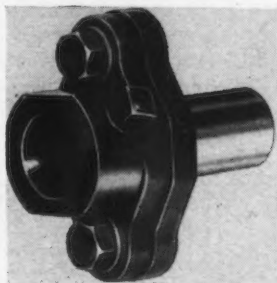
16 The Miracle collet chuck, adaptable to any standard bench lathe, has been produced by the *Micro Parts Co.*, 322½ East Beach Ave., Inglewood, Calif. It can be used with stock up to 1 in. permitting the full capacity of the lathe. Installation requires only a few minutes as no holes have to be drilled and no tapping or grinding are necessary. This precision tool



extends 1½ in. beyond the spindle nose of the lathe which is said to assure accuracy. The collet can quickly and easily be changed and once set cannot get out of adjustment. The entire unit revolves on the spindle. Additional collets are also available in rounds, squares and hexagons.

Adjustable Tool Holder

17 An adjustable drill and reamer holder has been announced by *Boyar-Schultz Corp.*, 2110 Walnut St., Chicago 12. The tool has been made to such close precision dimen-

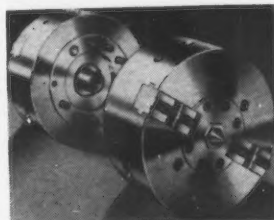


sions, it is said, that interchangeability in replacements is assured. It is made from drop forged alloy steel and of a design to withstand impact and strain. Hardened and ground mating surfaces, bore and

shank promote quick, easy adjustments and assure saving in setup time. The holder is available in three sizes, No. 00, No. 0 and No. 2 with either long or short shank in the No. 00 and 2 sizes. One bushing blank is furnished with each tool.

Power Chucks

18 A two-jaw compensating power chuck, Series 23100-A, designed to drive work on centers where ex-

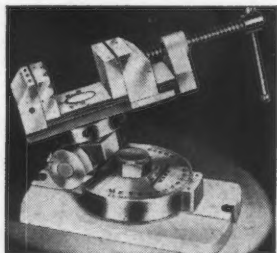


ceptionally heavy cuts are being taken with carbide-tipped tools at high spindle speeds, has been announced by *Skinner Chuck Co.*, 344 Church St., New Britain, Conn. Compensating action of the jaws, sufficient for gripping rough-forged or cast surfaces, is provided by a rocker attached to a plunger. The center fits into a standard Morse taper hole in the center plate. A thin nut, threaded on the maximum diameter of the taper, permits easy removal of the center without removing the center plate. The two floating jaws are of the nonadjustable type. The chuck is available in 8 and 12 in. sizes. Manufacture of Series 1400 and 1400-A selfcentering, power-operated, two-jaw, box-body chucks has been resumed by the company. The primary use of these chucks is for production work on objects of irregular shape, such as valve parts and pipe fittings. The chuck has only three moving parts: the wedge and the two jaws. The chuck is available in the 9 in. rated size with maximum capacity of 4½ in.

Precision Vise

19 Suited for die, gage and fixture, drilling and grinding work, an all-angle vise, manufactured by *Machinists Tool Co.*, 2834 West Lake St., Chicago 12, holds work at practically any required angle. Any vertical or horizontal angle can be set quickly and easily. Driv-wheel movement gives 2¾ in. lateral clearance, and perpendicular vise position can be obtained with-

out interference from base. Double swivel construction permits setting to any horizontal position. The vise, adaptable for use on grinders, drill presses and other machine tools as



well as for bench applications, is made in plain, plain swivel base, and the universal model illustrated which is available with 3½ or 4½ in. jaw sizes. Replaceable jaws, V-grooved jaws or a floating jaw for instant gripping are provided. Vise swivels 360° on base and has 90° vertical angle adjustment.

Quick-Action Vise

20 Known as the Vise Master, a quick-action heavy duty vise has been announced by *Grand Specialties Co.*, 3135 W. Grand Ave., Chicago 22. Vise Master closes instantly with push on free jaw and opens automatically by trigger release on its spring action. In addition,



this heavy duty speed vise is equipped with double bite steel pipe jaws which are integral with the body to eliminate time required to adjust loose jaws to pipe or tubing. It revolves full 360° on base with double swivel, friction type, lockup which fastens from both sides and securely holds the desired swivel position. The vise is 17½ in. long with jaw open, 13 in. closed, width 7½ in. and 7¼ in. high.

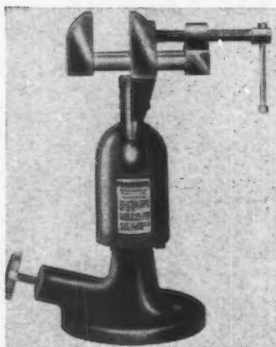
Jig Components

21 Straight, angle and wedge-screw designs, cam-type lever-operated units for a wide range of work-holding requirements are included in *Morton Machine Works'*, 2422 Wolcott St., Ferndale 20, Mich., improved line of jig and fix-

ture components. The line includes clamps and standardized assemblies for application in jigs and fixtures. Each unit is available in a range of sizes.

Universal Positioner

22 A universal work positioner to hold and position virtually all kinds of benchwork for production, assembly, service and maintenance, has been announced by *Garfield Engineering Corp.*, Troost Ave., Kansas City 5. The Powrarm positioner holds light or heavy work and permits turning 360° at any



angle on horizontal or axial planes and 180° on vertical planes. A principle of pressure applied to a ball and socket joint makes it possible to change the work position quickly and easily and lock it by fingertip adjustment of pressure control knob. Powrarms are produced in both hydraulic and mechanical models. Attachments for mounting many types of work are available.

Lock Wrench

23 Said to have gripping strength equivalent to 1-ton pressure, the double lever or toggle action of a new type wrench permits it to be used as a combination straight end or pipe wrench, vise, toggle press, clamp or pliers according to the manufacturer, *A.C.E. Inc.* Transportation Bldg. Detroit 26.



Parts of any size which will fit the maximum jaw opening of 1¼ in. can be firmly held for machining operations and the tool may be used as a clamp in welding or soldering operations or for removing bolts,

cotter pins, wire bending or splicing operations. The wrench made of cadmium plated alloy steel is 10 in. long.

Plier Clamp

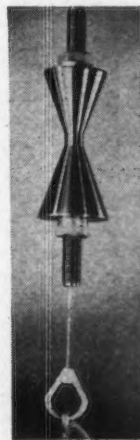
24 Designed primarily for holding small parts during drilling, grinding, sawing and welding op-



erations, the self-locking plier clamp known as Speetog-Elect manufactured by *Speed Tools Ltd.*, Gresse St., London, W. 1, is said to provide a grip of 300 lb with hand pressure of about 2 lb. The plier is made from high carbon steel forgings and has a jaw opening of ½ in. through an adjustment screw which is set to provide the required jaw opening. The tool is said to be well suited for repetition jobs as once the proper jaw setting is made, clamping action may be quickly applied and released.

Suspension Balancer

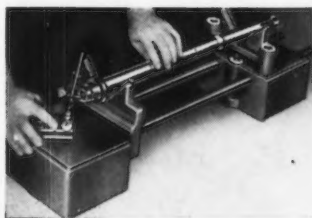
25 The suspension method of balancing has been made possible with a suspension balancer developed by *Sutton Mfg. Co.*, Third National Bldg., Dayton 2. The balancer consists of a hollow shaft at the center of which is supported a cable. The object to be balanced with the balancer shaft and proper adapters attached is hung in a horizontal position from any convenient support. At the top of the balancer shaft is a disk which is free floating over the vertical center line of the shaft. Under the disk is a ring which should be concentric with the disk when the object is in balance. Any portion of the ring which extends beyond the disk indicates that the object is heavy in the direction where the



ring shows. One inherent feature of the suspension balancer is its ability to be checked for absolute accuracy at any time by simply rotating the balancer assembly 180° in any object which has just been balanced.

Concentricity Checker

26 Concentricity checking, internal and external, on parts or products having varying diameters has been facilitated with the V liner developed by the Swanson Tool & Machine Products, Inc., 814 East Eighth St., Erie, Pa. The instrument consists of two V-blocks mounted on solid members which are held in correct alignment by cylindrical rods. These aligning rods are pressed into the first V block member and permit the second V block member with elevating V block to move as desired. V blocks have replaceable tool steel wear edges. The adjusting screw and nut, which raises or lowers the movable V on guide pins, is accurately calibrated and compensated for the



sine of the V. By setting the adjusting screw in accordance with the graduations indicated thereon to correspond to the diametrical difference between any diameter involved in any piece to be checked, the V liner is ready to position the part in horizontal plane for check-

ing. The V liner is available in Model A size, which can handle diameters varying from 1/4 to 6 in. diam, and from 1 to 24 in. in length.

Inspection Gage

27 An electronic snap gage for production inspection announced by Yankee Precision Products Co., 50 Bartholomew Ave., Hartford 6, features an electronic gage



head mounted on snap frames or on a stand for convenience in inspection of small parts. Sizes up to 3 in. are standard with 1 in. range of each size, and larger sizes can be furnished. Provision has been made to mount the indicator in top of frame instead of plug when readings are required. Locking arrangement on stand allows the gage to be set in any vertical position. The gage is operated on 110 v, 60 cycle single phase current.

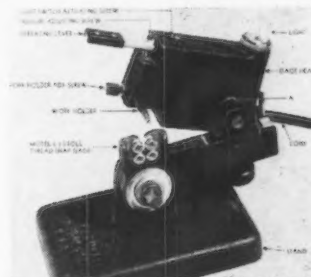
Precision Tools

28 A wide variety of gages and precision industrial tools of sapphire has been offered by the

Sapphire Products Div., Elgin National Watch Co., 932 Benton St., Aurora, Ill. The line includes hand burnishing tools, sapphire tipped cylindrical plug gages, cylindrical plug gages with solid sapphire members or with sapphire inserts, flat plug gages, and needle valve gages. Also, single and double style ring gages mounted in gold plated brass or plastic, burnish polishing tools, sapphire tipped dial indicator contact points, standard contact points and other precision instruments manufactured to customer specifications are available.

Roll Thread Comparator

29 To inspect small diameter hard-to-handle screws of fine pitch, Pratt & Whitney, Div. of Niles-Bement-Pond Co., West Hartford, Conn., has announced the Model C roll thread comparator with pressure control. Its use is recommended for builders of fine instruments and related industries when thread inspection is necessary on screws



of diameters ranging from 0.060 to 0.216 in. and threads of 80 to 28 per in. National Form 60°. The comparator uses the J-S gaging principle with a pressure control feature which relieves the operator of the responsibility of judging

TIME-SAVER CARD for your convenience in obtaining, without obligation, more information on any one or more of the new equipment items featured on this and preceding pages.

THE IRON AGE, New York 17, N. Y.

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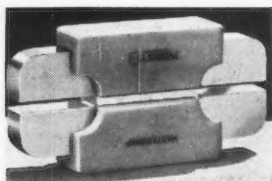
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borderline cases. The signal light instantly shows the result of full go and not go functional check on pitch diameter, minor diameter, lead and angle. Gaging pressure is adjustable to suit the work.

Snap Gage

30 Known as the Ellstrom Mastersnap, a snap gage incorporating the use of special gage blocks as accurate, nonwearing spacers in working, interchangeable assemblies has been announced by *Dearborn Gage Co.*, 22038 Beech St., Dearborn, Mich. The snap gage consists of a special gage block wrung between a pair of chromium-plated special alloy-steel jaws and locked in position by brass thumb fasteners. Thermoplastic insulators, green for Go and red for No Go combinations, are fitted over the

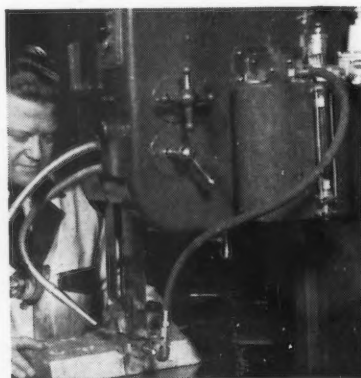


jaws to complete the assembly. Special gage blocks for the Mastersnap are available in sizes from 0.050 to 2.000 in. inclusive. They may be used separately or in combinations.

Band Saw Lubricator

31 Introduction of a spray lubricator as a clean, economical method of heat dissipation for high speed band saws has been announced by *DoAll Co.*, 1301 Washington Ave. S., Minneapolis. Faster cutting rates, improved finish and increased saw life are claimed for

its use. Easy to install, and operating from standard air pressure lines, the device straddles the saw blade from the back side and directs twin streams of lubricated air against the teeth of the saw. Lubricant is thus forced under pres-



sure in the form of metered mist into the teeth as they enter the work, and the work table does not get wet. Designed primarily for use in cutting nonferrous metals, the lubricator works equally well on many types of plastics where friction between blade and work softens the material to a gummy state.

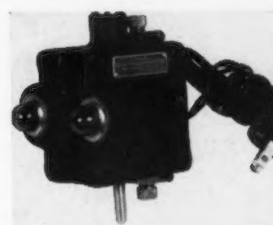
Small Parts Assorter

32 The Kari-all parts assorter, marketed by the Diagraph-Bradley Industries, Div. of the *Diagraph-Bradley Stencil Machine Corp.*, 3745 Forest Park Blvd., St. Louis 8, consists of a number of compartmented trays set in a ferris wheel arrangement. Bins can be adjusted to fit part sizes. The ferris wheel has a braking action which prevents the tray with the heaviest items from gravitating to the bottom. The Kari-all comes in

2 sizes: 18 in. long, capable of carrying as many as 65 different small parts and 12 in. long handling over 30 small parts. Both models are 12 in. high and can be fastened in an upright position from a side wall or from the ceiling. It is said to be especially convenient for use on assembly benches and in shipping rooms.

Electronic Gage Head

33 Announcement of an electronic self-contained gage head for direct connection to 110 v circuit without the use of transformers, tubes or rectifiers has been made by *Yankee Precision Products Co.*, 50 Bartholomew Ave., Hartford. The gage is complete within itself with plus and minus lights which



will operate within a gage setting of 0.00001, it is said. The head can be attached to a support or arranged to suit any specific application. Where close nesting of heads is necessary, light brackets can be removed and placed in a panel which then allows a total head width of $\frac{7}{8}$ in. The gage spindle is frictionless and contacts are made without any multiplication leverage through an electrical gas contact which eliminates any tendency of contact sparking, according to the manufacturer.

TIME-SAVER CARD for your convenience in obtaining, without obligation, more information on any one or more of the new equipment items featured on this and preceding pages.

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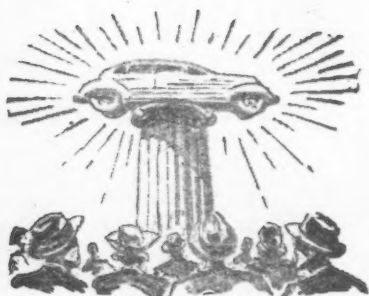
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MESTA MACHINE COMPANY . . . PITTSBURGH, PA.

Assembly Line . . .

WALTER G. PATTON

• UAW-CIO asks GM to guarantee 40-hr week. Supreme Court rules in favor of FAA... Mayor's committee to seek labor peace in auto industry.



DETROIT—Three events on the Detroit labor front during the past week will undoubtedly assume major importance as time rolls on. As yet, however, their significance can only be pointed out but not evaluated.

The event that received the biggest headline—the UAW-CIO demand for a guaranteed 40 hr week in General Motors plants—undoubtedly deserved the attention it got since this demand carries one step forward the union's long cherished hope for a guaranteed annual wage in the motor industry. GM has been vigorously opposing this at every opportunity.

The second event that sent labor reporters scurrying for their typewriters was the 5 to 4 decision by the U. S. Supreme Court, ruling that Packard must bargain with the Foreman's Assn. of America as the representative of its foremen. This case really goes back to June 1, 1942, or 7 years after the enactment of the National Labor Relations Act when the National Labor Relations Board in the Union Collieries case ruled that foremen may constitute a proper unit for collective bargaining. It was not until April 18, 1945, however, that FAA was certified by NLRB as the representative of the Packard foremen. Since May 18, 1945, Packard has been seeking a legal determination as to whether, under the Na-

tional Labor Relations Act, the company is required to bargain with FAA as the representative of its foremen. In this move Packard asked for—and obtained—the cooperation of FAA in testing this point.

A third important event taking place on the Detroit labor front was the first meeting of the Mayors' 18-man committee representing management, labor and the public. The committee is meeting to explore the possibilities of setting up a permanent Detroit Labor-Peace Board patterned after the well publicized and highly successful Toledo plan.

While the deep cleavages existing between Detroit labor and industrial representatives were kept well under control it was evident enough from even the first discussions that a meeting of minds will be achieved only if outstanding leadership is furnished by Committee Chairman, Frank D. Eaman, former Police Commissioner and a leading Detroit attorney. In addition, the warring factions must agree to check their well-known animosities and prejudices outside the meeting rooms and leave them there for the duration of the deliberations.

REVERTING back to the UAW-CIO demands on GM, the delegates to the recent UAW 2-day session here have authorized their representatives to present demands for a 23½¢ wage increase, an employee-financed social security plan, an old age retirement program and a wage equalization fund. The union is also asking GM to revise its vacation pay allowances to include 24 hr pay for employees with 6 months to a year seniority to 144 hr pay to those having over 8 years seniority. Thus, on a basis of a 40 hr week, the union is asking GM to give all hourly employees with 8 years seniority or more the equivalent of 3.6 weeks pay as a vacation allowance. Present GM worker vacation allowances were instituted 7 years ago and are now based on a percentage of annual earnings which ranges from 2 to 4½ pct, depending on the employee's seniority.

Walter P. Reuther, UAW-CIO president and co-director of the union's GM department, made it

clear that this is only the first step in what he called "laying a sound basis for a guaranteed annual wage."

"The General Motors workers feel it is only fair that when they are called into work in any one week," Mr. Reuther said, "that the company should guarantee them a full week's pay. Under the present setup the GM worker must hold himself available for work at all times. He cannot seek other employment nor can he obtain unemployment compensation, even though he may be getting paid for only a few hours work each week."

While no official statements have been given out by GM officials, the corporation's position with respect to what it describes as Mr. Reuther's plans for getting more and more without promising anything in return is well known. If the present union demands were to be accepted at face value it would appear that GM and the union could hardly be further apart at the present time.

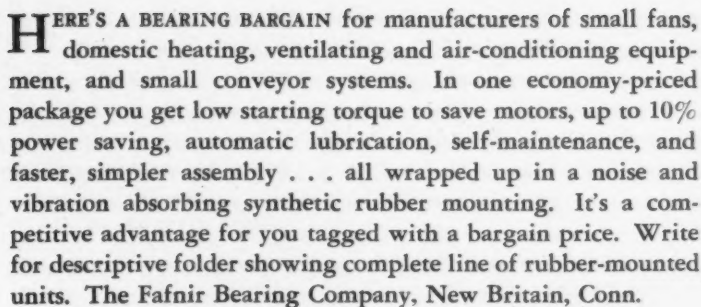
However, after taking into account the present lull on the national labor front and the history of GM-UAW-CIO negotiations in past years, most observers believed a strike was highly unlikely.

What remained to be seen, they pointed out, was just how much of the present UAW-CIO demands have been thrown in this time merely "for bargaining purposes." Most sources here believed that on the answer to this question might well hang the fate of the automobile industry in 1947: the number of cars that will be built, the price at which they will be sold, when there will be a break in the present record-breaking employment level in Detroit.

WHILE Packard promised to respect to the letter the U. S. Supreme Court decision that foremen are entitled under the National Labor Relation's Act to organize and bargain collectively, the company has not yet given up its fight against the organization of its foremen.

In a prepared statement, George T. Christopher said, "It seems quite possible that progressive Senators and Representatives in the 80th

Fafnir Rubber-Mounted Ball Bearing Units



MOST COMPLETE LINE IN AMERICA

FAFNIR BALL BEARINGS

Congress will recognize that our present 374 foremen are the front line of management and will enact remedial legislation to preserve the dignity, authority and independence of these and other foremen throughout the country."

"Congress may feel," he said, "that foremen cannot both serve a union and management at the same time; that any attempt to do so would be detrimental to discipline, efficiency and personal progress."

During the initial hearings of the Mayor's 18-man committee, Mr. Reuther expressed the opinion that the committee must learn if Detroit has a "climate in which labor and management can meet their responsibilities." A stum-

bling block to labor peace in Detroit pointed out to the committee by outspoken George F. Addes, secretary-treasurer of UAW-CIO, was that some decisions affecting Detroit's industrial plants are "made in Wall St. rather than here. In Toledo," he said, "factory managers control the local situation."

WHEN Henry Ford II, a member of the committee sought clarification of this last statement, Mr. Reuther explained, "We know where the ownership of the Ford Motor Co. is. Maybe we need decentralization of authority in corporations."

"Maybe we need decentralization in labor unions," Ford retorted.

Cites Figures to Show Motor Car Makers Get Fair Share of Pig Iron

Detroit

• • • The automobile industry which has been the principal complainant about shortages of pig iron is receiving more pig than in 1939 and probably about the same amount as in 1941, according to Harry L. Smith, acting director of the Review and Analysis Branch, office of the Housing Expediter.

This statement was made in a letter to W. M. Caldwell, assistant executive vice-president of the Gray Iron Founders' Society, Cleveland, who had asked for revocation of the CPA Certification Plan with respect to pig iron.

Replying specifically to the statement that "the automobile industry is probably receiving less than 50 pct of its pig iron requirements that were received for an average normally good year," Mr. Smith presented the following statistics to show that this was not the case.

Taking the output of foundry and malleable grades of pig iron in the United States, exclusive of the south, he said, statistics on output as given to CPA show the following (December is omitted from delivery data due to the coal strike; February is omitted because it is a short month):

Production gross tons:	
1939 average monthly output....	168,400
1940 average monthly output....	215,000
1941 average monthly output....	280,000
Deliveries gross tons (from CAP reports)	
September 1946	310,900

October 1946	336,100
November 1946	318,600
January 1947 (estimated)	299,500
March 1947 (estimated)	296,500

Of the above amounts, from 68,000 to 75,000 tons have been certified by CPA, according to Mr. Smith. Authoritative sources have been checked and rechecked, he added, and it appears that these same housing foundry consumers would receive without allocations at least 50,000 tons a month. Thus, assuming they would receive that amount, the other foundries including automobile industries would have in the above period received from 246,000 to 268,000 tons of pig iron a month.

This is almost the same as the peak 1941 deliveries of 280,000 tons a month, Mr. Smith declared, and much more than what is termed "an average normally good year."

Compared with 1939, the automobile foundries are receiving far more now than at that time, Mr. Smith charged. "Unless the blast furnaces are unduly discriminating against the automobile foundries in favor of other non-housing foundries, the statement that they are receiving only 50 pct of a normal prewar year appears to be inaccurate."

It is also stated by the Housing Expediter's office that foundries producing castings for automobiles, appliances, motors, farm implements, etc., are primarily in the North and draw their pig iron from the North. Exclusive of the Alabama area, he said, blast furnaces in the rest of the country have had less than 25 pct of their output certified under Direction

13 to Order M-21, the order which presumably channels material for housing. Therefore, the remainder, or 75 pct of the pig iron, goes to gray and malleable iron foundries making other items, and not 10 pct as stated by the head of the Gray Iron Founders' Society.

Detroit

• • • In response to an IRON AGE request for a comment by the Automobile Manufacturers Assn. in answer to the letter of Harry L. Smith of the Office of the Housing Expediter, the following statement was received:

"There has been no statement from the automotive industry indicating what percentage of merchant pig it is receiving.

"The automotive industry's position on the pig iron problem was expressed as follows by George W. Mason, president of the Automobile Manufacturers Assn., in a letter of Feb. 17, 1947, to Maj. Gen. Phillip B. Fleming, Administrator of the Office of Temporary Controls:

Since resumption of civilian motor vehicle production we notified appropriate government agencies each time their controls over critical materials threatened reduction of passenger car and truck output.

Our member companies now report that, because of shortage of pig iron needed by many of the foundries that supply them and the makers of essential motor vehicle parts, a drop in production and employment in many plants is threatened during March or April . . .

Such cuts, as you know, will not be from a full production level, but from the much restricted basis of operation now prevailing in the industry. Best information from the foundries is that such curtailment will not be momentary but, on present prospects, will run through the second quarter of 1947.

All the evidence we have is that the key to the pig iron shortage is the allocations to housing purposes, which seem to exceed present realistic housing completion schedules. We are fully aware of other conditions limiting pig iron supply, and it is because of these that we maintain it is absolutely necessary to avoid tying up valuable tonnage where it will not be put to immediate use.

We remain of the opinion that government allocation and priority controls of this type should be terminated immediately. A free market will most quickly accomplish an equitable and productive distribution of available materials, and the government should make this possible without delay. Failing to do so, it should face the fact that it is carrying the responsibility for curtailing employment and output of needed goods.

"The government appears to have confirmed the soundness of the automotive industry's position by removing controls over distribution of pig iron, except in the case of cast iron soil pipe and fittings, in its Dir. 25 to Priority Regulation 28."

For the new salt bath processes that are replacing old fashioned pickling for

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stainless, carbon, alloy and high speed tool steels and nonferrous alloys;

DESANDING

ferrous and nonferrous castings;

CLEANING

lubricants and surface dirt from stampings before plating or enameling

... removing residual rubber, carbon

black, plastics and lubricants from

process molds ... removing paint or

bonded rubber from metal parts ...

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● STEEL POT HAS INDEFINITELY LONG LIFE — MEASURED IN YEARS — DUE TO PATENTED, IMMERSSED ELECTRODE INTERNAL HEATING PRINCIPLE.

● AUTOMATIC STIRRING ACTION PREVENTS LOCALLY OVER-HEATED ZONES. GUARANTEED TEMPERATURE CONTROL — WITHIN 5°F. THROUGHOUT THE BATH — PREVENTS EXCES-

SIVE DECOMPOSITION OF TEMPERATURE-SENSITIVE BATH COMPONENTS (SUCH AS SODIUM HYDRIDE).

● LENDS ITSELF INTERCHANGEABLY TO ANY OF THE PROCESSES NOW AVAILABLE FOR DESCALING AND CLEANING.

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For proof of the effectiveness of descaling, desanding and cleaning in AJAX electric salt bath furnaces, send specimen work to be processed in the Ajax Metallurgical Service Laboratory — without cost. Reprints of pertinent technical articles are available on request.

AJAX ELECTRIC COMPANY, INC.

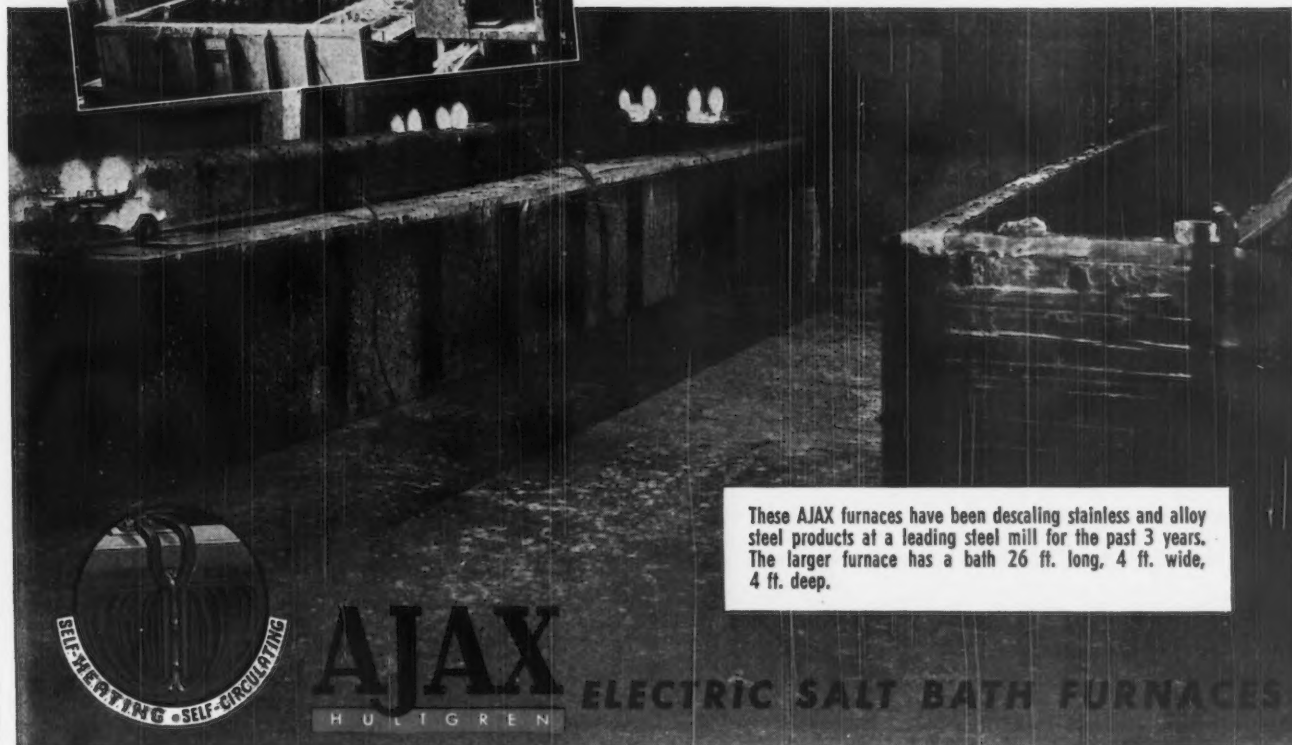
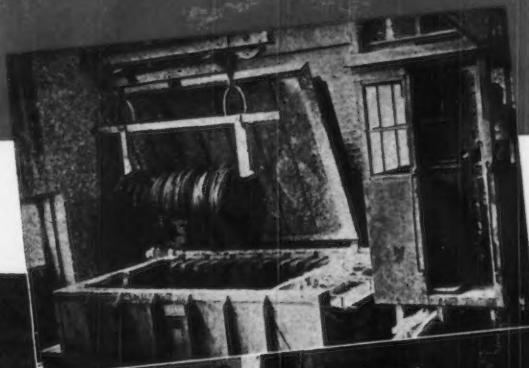
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The World's Largest Manufacturer of Electric Heat Treating Furnaces Exclusively*

In Canada: Canadian General Electric Co., Ltd., Toronto, Ont.

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These AJAX furnaces have been descaling stainless and alloy steel products at a leading steel mill for the past 3 years. The larger furnace has a bath 26 ft. long, 4 ft. wide, 4 ft. deep.



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ELECTRIC SALT BATH FURNACES

• Industry assured by President against too drastic tariff cuts . . . Yet concern does exist . . . Budget savings will be smaller than promised.



WASHINGTON — Assurance against destruction of our tariff system was given by President Truman in his speech at Waco, Tex., regarding the forthcoming April meeting of 18 nations in Geneva to negotiate reciprocal tariffs. This assurance was derived from his statement that the United States does not propose to eliminate tariffs, but proposes only reductions on some products and the removal of discriminations. Actually the list of such products is long. It will mean, Mr. Truman said, "not free trade, but freer trade."

In completing the draft of a charter for the International Trade Organization, the announced purpose is to set up a plan for fair business among the countries of the world. The President pointed out that the United States is looked to by other nations to see what pattern it designs in international affairs. To isolate ourselves and decline cooperation, he said, in effect, would be a disaster beyond comprehension. He asked for bipartisan support both in the fields of economics and political foreign policy.

Indications are that he will get it, not completely, but to a large degree. One reason that he will do so is the hope, if not conviction, by

members of both parties that unless the United States does work and give additional aid to other countries, the whole world will turn to tight regimentation that will take on the character of the Soviet system. Mr. Truman declared that what this country wants is freedom of enterprise, not free trade.

It is obvious that other nations, most of them in desperate financial straits, will have to purchase more from the United States than they can sell to it for many years to come. War has destroyed much of their productive capacity. But what they will have to sell in partial payment for what they purchase, it is insisted, must carry low import duties. Much of these incoming shipments will, at least for many years, consist of raw materials or other commodities which this country needs. On some of them, there is no sound reason why they should be dutiable. They can, however, be reduced by 50 pct in the case of an original cut. If reduced again they can be slashed another 50 pct, meaning a total cut of 75 pct.

THE President, of course, was only indicating the trend toward tariff cuts to be made when he said they will not mean "free trade." The reciprocal tariff act does not permit "free trade" if by that term is meant no duties on any incoming product. It is to be hoped too the cuts on products that compete sharply with foreign commodities will not be so sharp that, once they begin to enter the United States, they will flood the domestic markets.

There is real apprehension in industry that this will happen if the United States negotiators become too generous in making concessions. It is clear that there is such a tendency, especially in the State Dept., despite denials. Importation of cheaply produced goods in a much higher cost American market could be more disastrous than even the highest tariff wall as bad as it is. It definitely would mean widespread unemployment and tremendous loss of purchasing power in this country.

An executive order by the President provides an "escape clause" to protect the domestic industry from being hurt by such imports. Yet there is a serious question whether

such damage would be conceded, except in rare cases, or if acknowledged, whether the escape clause would be made effective soon enough to prevent widespread harm to the domestic economy. Those holding this view point out that reciprocal means mutually exchanged. It is not a one-way operation. Hence, they urge, the United States must not do all the giving and receive nothing in return.

TO this end, it is maintained, other nations must make real concessions. No more than the United States, should they yield necessary protection for their own interest. Yet it is well known that there are preferential tariffs, blocked currencies, quota systems and so on that do discriminate unfairly against the United States. These probably will be subjects of heated debate at Geneva and it is clear that there is frank doubt that the United States will be able to do much about them. If this proves to be true the negotiations will be a deep disappointment if not almost valueless.

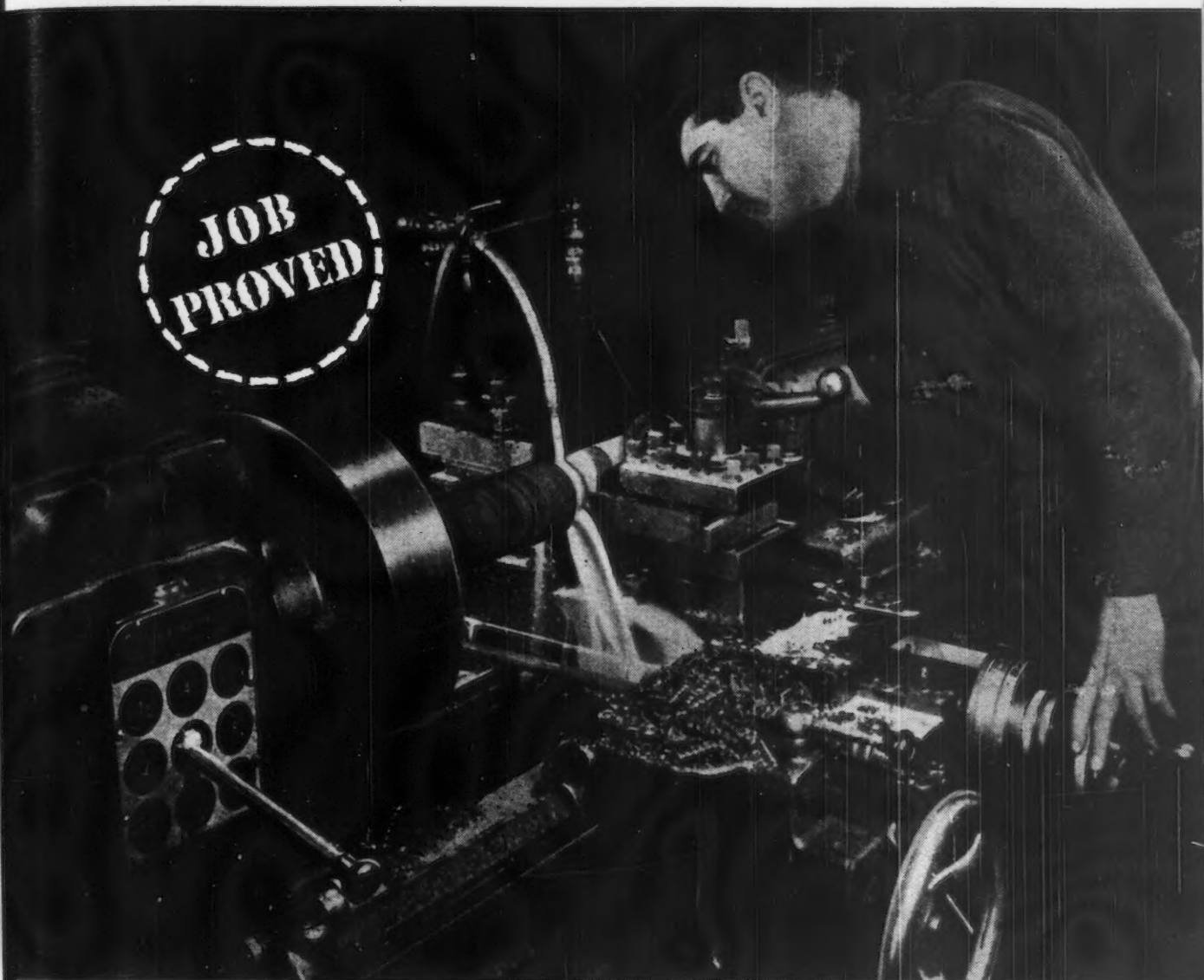
There is much insistence that the United States must cooperate with the rest of the world. In view of the enormous food and industrial supplies shipped and the tremendous financial aid given to other nations the United States, it would seem, has been doing a great deal of cooperating. This help, it is freely admitted, has been necessary and will continue to be for many years. At the same time, it is hoped that distribution of shipments in the future will be more satisfactory than it has been. For it is well known that a lot of material got into the black markets and never reached the needy.

American taxes already are extremely heavy, "greater than the people of the country can stand" in the words of Senator Taft. So additional financial and other aid given foreign nations should be distributed wisely.

This done, it is hoped that the reciprocal tariff program will develop into a cooperative plan that will be beneficial to all countries. This old world totters on a shaky foundation and needs such a shot in the arm.

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deal of fire in the current Congressional effort to effect some substantial cuts in the budget and accompanying tax reductions is largely expected to turn out in the end as smoke. Admittedly there will be a heavy laying on of hands with resulting cuts in various appropriations bills; it is a safe bet, however, that many of these budget slashes will have to be offset before the end of the next fiscal year with deficiency appropriations.

There are a number of reasons for this situation despite GOP promises last year to bring to an end the New Deal era of free spending. Most of them, to the despair of the Republicans, are beyond the control of Congress at the present time.

For instance, although most industrial subsidies such as premium payments for housing materials have almost run their course, the 80th Congress finds itself committed to carrying on a number of agricultural aids in support of commodity prices; another example is the many public works projects initiated by Democratic Congresses. Admittedly, a sharp blow would be dealt to agriculture should these subsidies be suddenly shut off. As far as public works are concerned, aside from the fact that funds al-

ready expended would be lost if the projects are not completed there are the political considerations—public money spent in a district or state means votes with an election year coming up.

Furthermore, there are certain fixed charges such as interest on the public debt and allowances for tax refunds which must be met, and as well as substantial amounts for veterans' needs and requirements under the GI Bill of Rights. New foreign commitments which will inevitably increase provide anticipated expenditures which were not contemplated a few months ago.

PERHAPS most important is the growing realization among the Republican majority that substantial savings in the executive departments of the government cannot be made efficiently until the entire governmental structure is completely overhauled. Mere limitation of personnel ceilings will not accomplish much savings in a monetary way as long as it is easier to fire three or four low-paid clerks than to get rid of a single employee in the higher brackets.

While it is uncertain as to how far it will get, a definite move has been made to introduce modern management methods into the busi-

ness of government. A proposal jointly sponsored by Rep. Clarence Brown (R-Ohio) and Sen. Henry Cabot Lodge, Jr. (R-Mass) would establish a 12-man commission drawn from Congress and government and private life. Its purpose would be to study the problem of reorganizing the government and to report back to Congress by January 1949.

Leaders of both parties endorse the move and early hearings are expected to be called. Legislators are acutely conscious of their unfamiliarity and lack of understanding of the complex bureaucracy built up over the past decade. Many of them are also aware that little may be expected from their present puny efforts at saving until something definite has been done to remedy government machinery and obsolete legislation which forces overlapping duties and wasteful functions.

Illustrative of this are figures recently presented by Senator Lodge which showed that within the government there are 29 lending agencies, 3 insuring bank deposits, 34 buying land, 16 preserving wild life, 10 in government construction, 12 in home and community planning, 65 in gathering statistics, and other duplications.

Anguished cries come from department heads that proposed budget cuts would curtail essential functions of government; in view of the paucity of knowledge, Congress is understandably reluctant to make drastic cuts. The Brown-Lodge measure should provide that knowledge.

Peak February Disposals

Washington

• • • A new peak in surplus property disposals was reached in February with a preliminary total of more than \$1.25 billion in sales during the month, a quarter-billion more than the former high in January.

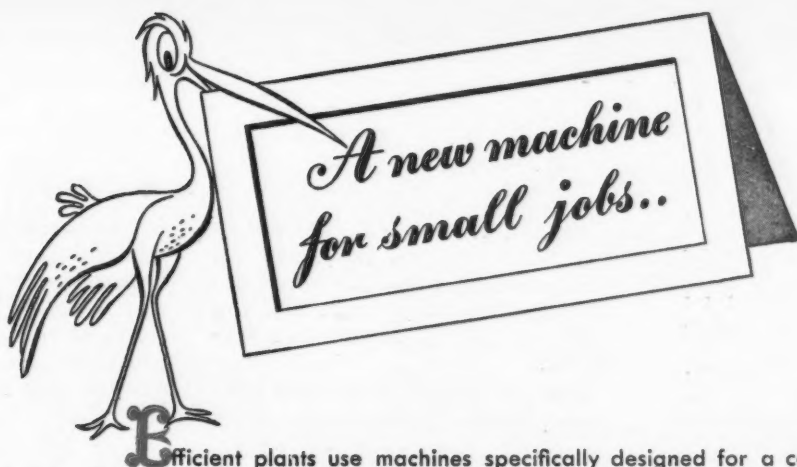
Boosting the February total, however, were two unusual and non-recurring WAA sales—the Big Inch and Little Big Inch pipelines for \$143 million, and \$237 million worth of Army K rations.

February real property disposals by sale or lease by WAA accounted for \$448 million and general products, both consumer and producer goods, \$650 million; the remainder was disposed of by other agencies.

THE BULL OF THE WOODS

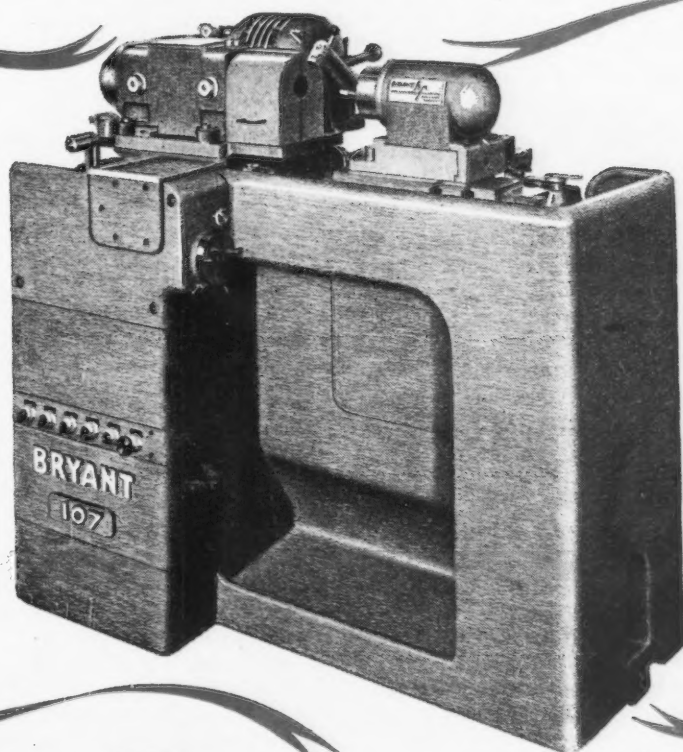
BY J. R. WILLIAMS





Efficient plants use machines specifically designed for a certain range of work sizes. For greatest efficiency in the grinding of small holes ($\frac{1}{8}$ " to 3"), Bryant offers the new, small Series 107 Internal Grinder. ● The Series 107 is designed for tool room and small lot grinding. It has a chuck swing of 9 inches, a maximum traverse stroke of 6 inches and a maximum grinding stroke of 4 inches. Provision can be made for 11" swing. Preloaded ball bearings are used on both cross and longitudinal slides. This allows the use of a very light wheel slide, yet provides the utmost rigidity and sensitivity necessary for extremely precise work with quality finish. The new Series 107 uses the Bryant High Frequency Wheel Head as standard equipment. This provides direct wheel spindle drive at speeds up to 100,000 r.p.m., assuring the efficient surface speeds so necessary when grinding small bores. Belt drive is available for slow speeds. ● Although a minimum of floor space is required, operator comfort has been carefully considered. The simplified controls are conveniently located, and the operator may operate the machine, either when standing or sitting. Write for complete details on this new, small internal grinder that is functionally designed to grind small bores.

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• Foundries and steel producers clamoring for pig and scrap . . . Daingerfield operation may ease iron situation . . . Shipbreaking still major potential scrap source.



SAN FRANCISCO — Foundries and steel producers on the Coast are taking the recent price increase on pig iron in stride—or rather, they would if they could get the iron.

Caught between a scrap shortage and faced with continued scarcity of pig, these producers are being squeezed to the point where it begins to hurt.

Those foundries favored by government allocations of pig iron at least until the end of this month and possibly after that date under PR-35, are reasonably happy and are charging their cupolas with up to as high as 90 pct pig which is only a few dollars higher than good scrap which is almost nonexistent. These few producers of the limited number of commodities considered critical in the Veterans' Emergency Housing Program are expected to continue to follow this practice and are looked upon with envy by their less fortunate contemporaries.

Emphasizing the scarcity of No. 1 cupola scrap are the isolated purchases reported where \$4 and \$5 per ton have been paid over the going prices.

Columbia Steel Co., with its blast furnace at Provo and access to Geneva Steel Co.'s production of its three furnaces at Geneva, is well situated in the present crisis. Kaiser Co., Inc., is also able to hold its own at Fontana, but has no

merchant iron to sell. Bethlehem Pacific Coast Steel Corp. and the western independents, however, are finding the going tough and are drawing heavily on scrap inventories.

Feelers from eastern scrap buyers who are watching the West Coast scrap prices and calculating the possibility of buying here and shipping to eastern mills aren't making life any easier for local purchasing agents who recall the heavy movement of prime shipyard scrap last year. However, so far as can be learned, no major quantities of scrap have gone East since that time and unless the eastern market continues its wild gyrations upward, there is little likelihood of important shipments being made from the West, according to informed observers.

Steel producers continue to look to the government for aid in producing scrap and some are bitter on the subject of the delay in getting ships released for cutting up. A purchasing agent in the Northwest said: "CPA sent two men out here on Dec. 2 and said that we would have ships to scrap within a week. They have been telling us the same thing ever since then. There have been no ships scrapped in this area since last April. In the harbor over at Olympia merchant ships of all types—mostly old ones—are tied up just waiting to be scrapped, but the government won't release them." (See THE IRON AGE, Dec. 19, 1946, p. 94 and Nov. 21, 1946, p. 86).

WHETHER operation of the 400,000-ton annual capacity blast furnace at Daingerfield, Tex., by the Lone Star Steel Co. scheduled to be blown in about the middle of May if contracts are signed this week will materially help relieve the West Coast pig shortage is being debated.

This plant, 125 miles east of Dallas, was recently reported purchased by the Lone Star Steel Co. for \$7.5 million to be paid at the rate of \$2 per ton of iron produced. WAA subsequently denied that contracts had been signed. With proved ore reserves and satisfactory coking coal available, com-

petent observers are of the opinion that the plant can produce iron at competitive costs (See THE IRON AGE, June 28, 1945).

Brumley-Donaldson Co., Pacific Coast brokers, has been named as national sales representative by the new plant owners and reportedly has already received offers from General Motors and Ford Motor Co. for a large part of the blast furnace capacity at prices in excess of the present market.

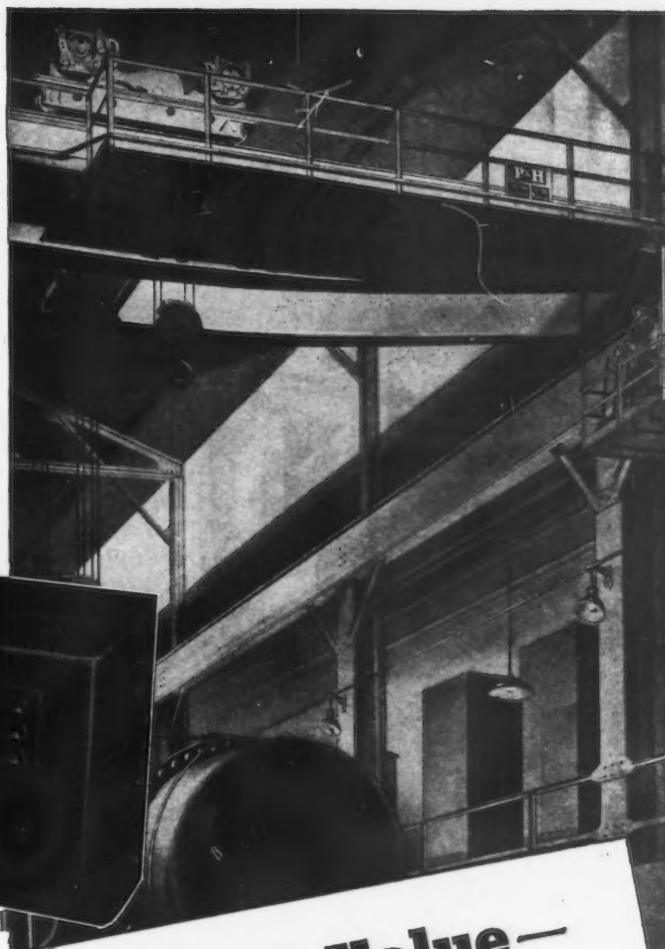
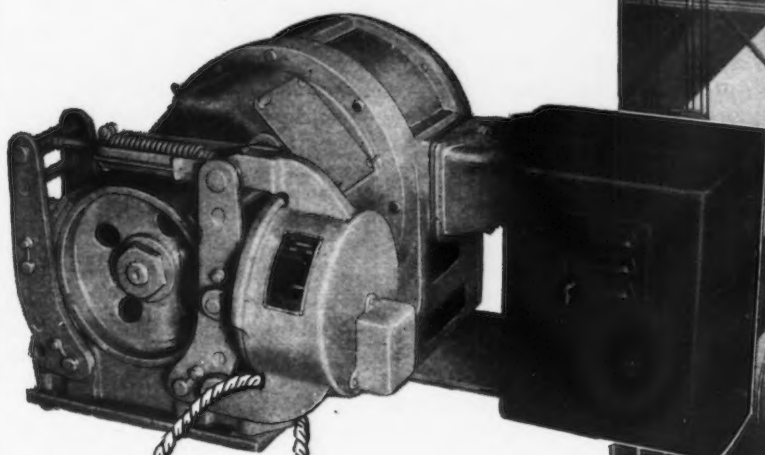
Lone Star Steel Co. is now headed by John W. Carpenter who is also president of the Texas Power & Light Co. of Dallas. He was one of the principal stockholders and promoters of the original company. Vice-president is Dr. George H. Anderson, and George D. Ramsay is vice-president and general manager in charge of operations. Mr. Ramsay is widely known in steel circles and at one time was in charge of the raw materials department of the Fontana steel plant of Kaiser Co., Inc.

This added iron production would be welcome news to foundries and steel producers in the West, but the freight rate of \$12.41 per long ton from Dallas to California points and \$13.73 to Seattle poses an economic question. While Lone Star doesn't yet know what its production costs will be, it is reported that a price of \$33 per ton for basic pig is being tentatively established. This would mean a delivered price on the Coast of from \$45.41 to \$46.73. Basic pig from Provo, Utah, is being delivered to San Francisco for \$38.94 per long ton.

IT is generally conceded that under present market conditions, even this price differential would probably not prove a serious barrier to sales. There is, of course, always the possibility that the Southern Pacific and Santa Fe railroads would consider a rate reduction in the light of the tonnages involved.

The water rate from Houston to Pacific Coast points is \$8.74 per gross ton plus unloading and wharfage which would still make the delivered price higher than that for pig iron from Provo even

P & H RECTIFIER CRANE BRAKES



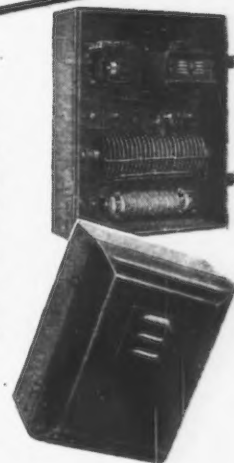
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without the rail freight from Dallas to Houston.

The Lone Star Steel Co. is looking to the major certified or priority buyers on the Coast as good potential customers. They estimate that four such buyers in the Los Angeles area consume approximately 2000 tons per month; two in the San Francisco Bay area approximately 2000 tons per month; and that the Pacific Northwest has three such buyers consuming approximately 3000 tons per month. This total tonnage of 7000 is an inviting market although it represents only approximately one-fifth of the anticipated production.

Coke ovens at Daingerfield are scheduled to be fired up within the next 2 weeks and after a stockpile for blast furnace operation is built up, the company plans to market its surplus.

LOS ANGELES—Howard Foundry, of Chicago, one of the largest foundries in the country, has come to the West Coast through purchase of two local foundries—Northrop and Equipment Engineers. Facilities of the two firms have been consolidated and placed in operation under the Howard name.

Principal production of the new West Coast branch will be commercial castings, with some work for the aviation industry. Manufacture of aluminum sand castings and magnesium permanent molds, and brass and bronze castings started last week, according to E. G. Buscher, general manager of the West Coast unit.

Northrop Foundry formerly manufactured aviation castings and commercial castings. Equipment Engineers Foundry produced electric steel precision castings. Facilities of both plants were bought outright by Howard and moved into the former Northrop Foundry site at 1985 E. 16th St., Los Angeles.

New equipment now being moved into the plant include molding machines, furnaces, and laboratory control equipment. Core ovens have been moved in from the former Equipment Engineers plant, and an electric steel furnace is now being built. The 40,000 sq ft of working area may be expanded to accommodate the additional equipment.

Extensive laboratory facilities for all alloys, and a pattern shop, have been added. X-ray machinery

and sand control equipment are now in operation in the laboratory.

DOUGLAS AIRCRAFT reports a backlog of unfilled orders at the end of the year amounting to \$209,200,000, of which 56 pct represents orders from domestic and foreign airlines. New orders, less cancellations, during the last quarter of 1946 totaled \$47,600,000; shipments during the period were \$21,300,000.

A drop of 85 pct in the sales and billing resulted in an operating loss of \$2,019,478 for the fiscal year ended November 30, 1946. After application of a \$4,200,000 Federal income tax carry back, the company reports an income of \$2,180,522.

HIGH strength, lightweight metals are now being employed in the manufacture of casement windows. An aluminum alloy window made of 63T-5 extrusions, featuring invisible mortised joints, upright extruded members, and requiring no welding, promises advantages in greater strength and neater appearance. Lightness, long life, ease of operation, and low upkeep costs are other advantages pointed out by the manufacturer.

Present production of the windows at Timm Industries, subsidiary of Timm Aircraft Corp., Los Angeles, is 200 units a day. Several thousand have already been assembled into new buildings in southern California. Capacity output of 800 windows a day is anticipated by May 1, according to R. B. Buckley, Timm Industries president.

Construction of the aluminum alloy window allows the casements to be shipped knocked down.

SALT LAKE CITY—Most Utah and Nevada locals of the International Union of Mine, Mill & Smelter Workers have decided to cast their lot with the revolting group which is waging ideological warfare with the Reid Robinson faction.

A new union—the Rocky Mountain Union of Mine, Mill & Smelter Workers—has been organized and will, with other dissident groups, seek separate affiliation with the CIO.

The resignation of Mr. Robinson as president of the international union and the succession of Maurice E. Travis of Martinez, Calif., will not retard the move-

ment, according to temporary officers of the new organization.

Dan Edwards, international board member for this district until he was ousted in the "right wing" purge, said:

"The change in leadership in no way alters the vicious political control of the international. Mr. Travis has long been identified with the same ideology subscribed to by Mr. Robinson, and the change in leadership was just a political maneuver."

The revolt against Mr. Robinson's leadership was rising in this section more than a year ago but was temporarily stilled by the 6-month mine and smelter strike during the first half of 1946. The new regional union has been in process of organization for several weeks but was not publicly unveiled until Mr. Robinson's resignation was announced.

Pressure on Utah's legislature for more money to increase salaries of school teachers has raised a sharp and heavy tax hatchet over the heads of the mining and other natural resources industries, in the state.

The school bloc, in its search for more revenues, has introduced a bill which would impose a graduated tax of 5 to 8 pct of net proceeds on metal mines, including iron; 5 pct of market value on crude oil, natural gas and salt; 2½ pct of gross market value on other natural and wasting resources and a modest 1¢ per ton on coal.

At present the mines pay an occupation tax of 1 pct on gross proceeds, the regular property levy on a valuation based on two times net proceeds, and a property levy on land, building, equipment, etc.

The proposed 5 to 8 pct tax on net proceeds would replace the 1 pct of gross but in no case would the tax be less than the present 1 pct of gross.

According to computations made by the mining industry, the bill would increase the present mine tax by 100 pct in the lowest bracket and by 320 pct in the highest bracket. One company has estimated that it would take 44 pct of its real net earnings.

Up to date the measure has had little steam behind it and will probably die in sifting committee, unless the lawmakers get over-extended on school commitments to a point where new tax bills must be enacted. Then anything can happen.

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• **Slow industrial recovery follows England's fuel crisis . . . Government encourages night work . . . France and Belgium may stop shipments of semifinished steel to Britain.**



LONDON—The effects of the fuel crisis are now beginning to taper off, but it will be months before British industry is able to achieve a semblance of normal production. The final sections of the country where industry was shut down have now been opened, but the drastic cuts levied on domestic consumers still remain, and offices remain dark in the proscribed 5-hr period each day. Many London offices have adopted a policy of working from noon until 7 or 8 p.m., to avoid the long morning blackout.

No one has had the courage to make a detailed estimate of the impact of the crisis on the British export drive. Some guessers have thought that as far as the national economy is concerned 10 pct of the country's income for the year will be lost, but no official statements have been made on the subject.

The nearly tragic situation which brought about the fuel crisis is clearly demonstrated by the admission of Sir Stafford Cripps that for the first 2 or 3 weeks following the shutdown coal supplies would be "improvised" on the basis of 30 pct of January requirements, and after that until May 1 allocations would be on the

basis of 50 pct of requirements. Thereafter Sir Stafford promises two new allocation plans. One of these plans will cover the summer period while stocks are being built up for the winter, the other will be a winter plan.

There has been a boom in auxiliary oil burning power plants, and many firms have improvised their way through, maintaining a semblance of production if their requirements were not too high. This expansion has been limited, however, by the fact that most builders of such equipment are tied to export orders that prevent large-scale domestic deliveries. The British Ford Co. has put out a notice stating that its Fordson tractors are playing their part in the operation—135 special deliveries have been made at auxiliary power plants. A forging firm is operating three forging hammers with tractors, small engineering firms are also using the tractors, and one foundry during the shut-off used a tractor to keep the cupola going, then shunted it to the dressing and fettling departments to keep some castings coming out.

NIGHT work is being resorted to as a short term expedient in much of the industrial midlands of England and is being encouraged by the government in other sections of the country. Agreements are being negotiated between employers and the unions for night work to consume electricity in off peak periods for the next 2 to 3 years, until the installed electric power capacity can have an opportunity to catch up with postwar demand. Some difficulties are being encountered with arrangements for women for night work; it seems likely that they may not be included.

Considerable public criticism of the government's goal of 200 million tons of coal output for 1946 has been voiced recently. The 1946 output totaled 189 million tons, and many sources have expressed the opinion that the aim should be higher. The mine workers have taken the attitude that 200 million is a goal that cannot be reached without improved working conditions for the miners, and promises

have already been made to the miners' union that special consumer goods allocations are on the way.

Heavy pressure was applied to Hugh Dalton, Chancellor of the Exchequer, to obtain his promise that he would give special consideration on income taxes to the miners, but he has made no statement thus far. Usually knowledgeable sources state that Mr. Dalton is planning to lighten the burden of income taxes for the smaller income classes in England, when he announces his budget in April, but he has refused to make any announcement before that time. The government has clearly accepted the idea which has been propounded by the press that if the miners must get more than their share of the meat and sugar and household consumer goods in order to increase coal output, then they shall get it.

This idea is reported to be working out successfully in Germany, where greatly increased food rations for miners, and a points allocation system of consumer goods to miners who attend work regularly and produce satisfactorily is meeting with success. The system has been slow in getting into operation, but the first month results have pleased British military government officials.

THE French military government staff is reported to be removing industries from the French sector of Berlin, presumably for reparations, which are to be located in the Saar. The Rheinmetall-Borsig Works is to be thus dismantled, and other factories in the sector have been closed for "inventory," which was the preliminary step to the dismantling of the first works.

The power shortage is affecting other countries as well as Britain. Indirect exports of power from the Ruhr to the French zone of Germany, and from the French zone into metropolitan France, have been draining the German grid, and estimates from Vienna indicate that Austrian steel output for the year will be controlled by the power shortage. Due to the shortage of fuel, the only producer



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THE IRON AGE, March 20, 1947—85

in Austria, the Alpine-Montan A.G. at Donawitz, in Styria, was closed down on Feb. 1, and has not yet reopened at this writing. Production at the works had been rising during 1946, although the output never reached 50 pct of the prewar monthly average. The first blast furnace had been opened on Aug. 10 of last year.

A mild shortage of labor might also affect Austrian steel output, if sufficient fuel supplies were available, but the absence of traditional imports from Silesia and Czechoslovakia have applied a rigid limit to output to date. Coal which has been used recently has been coming from the Ruhr, being coked at Linz, but the coke ovens closed down in mid-January.

The delicate balance of the Belgian wage-price structure is being strained as the government of that country attempts to further reduce inflated prices. A nationwide flat rate 10 pct decrease was effected last summer, as previously reported, and the government has ordered another series of price cuts, ranging from 2 pct on some products to 15 pct on some others. The effort of the government is to end the vicious spiral in which the black market plays such an important part. Resistance on the part of industrialists will make this new cut more distasteful than the previous one, although all sources agreed that the initial 10 pct reduction was only the first mile on a long road.

IN the national Belgian effort to reduce government expenditures the subsidy on coal prices has just been eliminated, increasing the selling price of that commodity from 480 francs (\$10.90) to 600 francs (\$13.63). This increase is bound to have an effect

on the Belgian steel industry, which is already selling steel to its domestic market at cost. The British Government buyers, who had hoped to whittle down Belgian prices in their current negotiations for substantial imports of semis, will certainly meet increased resistance in Brussels.

There is increasing feeling on the Continent that the old established policy of selling semifinished steel to Britain for the finishing industry here to process and sell to consumers or re-export may not be a wise long-term policy. The view is gaining wide acceptance in European countries that the way for those small nations to compete in world markets is in the production of commodities in which labor represents a maximum portion of the costs.

This factor would tend to take advantage of higher labor costs in America. Thus there is a strong feeling among some circles in France and Belgium that plans

should be made now to stop the shipments of semifinished steel to England, in favor of expanded finishing capacity in their home industries. This possibility has implications of difficulty for the present plans of the British industry, which has made these imports a part of its permanent policy.

The Italian Government has recently announced that negotiations have been completed with the government of Argentina for the emigration of Italian workmen to South America. If present indications are to be accepted, manpower may become Italy's most important capital in the postwar world. The South American countries are all interested in skilled Italian labor to assist in their industrialization programs, and Italian labor is drawn strongly to any future in the New World. The first agreement with Argentina calls for an initial contingent of 4000, and monthly quotas of 2000 thereafter.

Canadian Manufacturers Cut Operations Due To Tight Steel Supplies

Toronto

• • • Under steadily expanding demand the iron and steel supply situation in Canada remains tight and there are no indications of much improvement in conditions for the next 6 months. While Canadian consumers continue to import steel from the United States, supply from across the line is not sufficient to meet all requirements and it is learned in reliable quarters that some branches of the automotive industry curtailed operations during the week due to the steel shortage. Nail makers

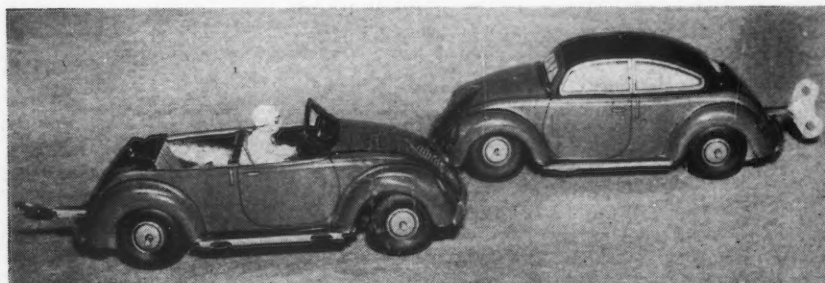
report difficulty in obtaining wire rods and as a result operations at some plants have been curtailed.

Canadian steel mills are not making any special play for new business at this time, but they have been accepting some additional tonnages for second quarter delivery. New orders, however, are almost entirely from customers that receive regular quarterly quotas and some of these have had their allotments extended.

On steel sheets and carbon bars, mills are fully booked to the end of June, and some have withdrawn from the market, declining additional commitments for second quarter, while others are accepting business which will not be delivered until third quarter. On steel plate mills are holding commitments to about two months ahead.

Notwithstanding soaring prices in the United States, Canadian iron and steel prices remain unchanged, with Wartime Prices and Trade Board ceilings remaining in force. On cold-rolled steel, which is a comparatively new product to Canadian steel mills, ceiling prices do not exist, and makers are quoting prices comparable to those prevailing in the United States.

SMALL SIGN: In these tiny toy cars observers see a small token of the revival of what was once a flourishing industry. They are made in the American zone of Germany and have just reached the New York retail market.





 **vibration protection with *teeth* in it!**

There's no locking principle that can match the tapered-twisted teeth of the Shakeproof Lock Washer for positive protection against the loosening action of vibration. Whether you're using a large size to anchor a motor block or a small size to assemble a delicate instrument you'll find that Shakeproof's exclusive teeth bite into both surfaces and set up a strut-action lock that prevents the screw or nut from working loose. Vibration protection like this is the result of constant research . . . the kind of research that has produced Shakeproof's newest lock washer which is available now in some of the smaller sizes. This new lock washer has a greater number of teeth which provide an increased tooth area for still better locking. With more metal at the rim, resistance to flattening is increased and breakage is virtually eliminated. In short, it's our famous tapered-twisted principle applied in such a way that you get more teeth, more locking edges.

SHAKEPROOF LOCK WASHERS



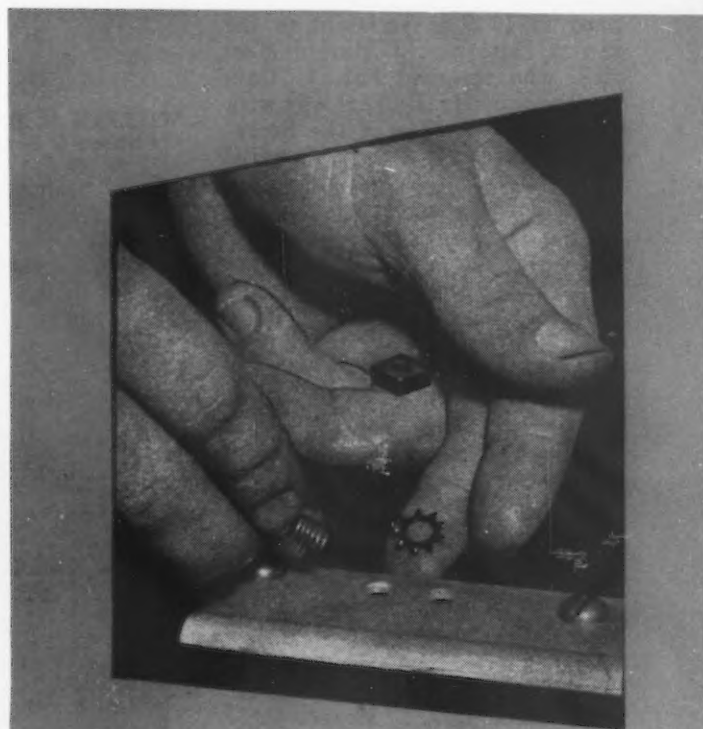
SHAKEPROOF, INC.

Division of Illinois Tool Works

2501 North Keeler Avenue, Chicago 39, Illinois
2895 E. GRAND BLVD., DETROIT 2, MICH.

OFFICES IN OTHER PRINCIPAL CITIES

In Canada: Canada Illinois Tools, Ltd., Toronto, Ontario



PERSONALS

• • •

• **D. S. Harder** has resigned as chairman of the board and director of E. W. Bliss Co., Brooklyn, because of his complete occupation with his duties as vice-president in charge of operations for the Ford Motor Co. Mr. Harder resigned as president of E. W. Bliss in December 1946 to assume the Ford post.

• **Edmond J. McSweeney** has been elected vice-president in charge of manufacturing, Hydraulic Press Mfg. Co., Mt. Gilead, Ohio, succeeding **R. J. Whiting**, who has resigned. Mr. McSweeney was formerly president of the Vulcan Iron Works and general superintendent of motive power of the Baltimore & Ohio R.R. During the war he served as a civilian consultant to the Army Transportation Corps.

• **James Hoghland** has been appointed assistant Pacific Coast sales manager of Russell, Burdsall & Ward Bolt & Nut Co. Mr. Hoghland, who has represented American Screw Co. for the past 5 years, and was formerly assistant sales manager of Parker Kalon Corp., will have his headquarters at the new RB&W plant recently purchased from Cooper Screw Co. in Los Angeles.

• **George H. Halbert**, New York attorney, has been named general attorney of Rheem Mfg. Co., New York. Mr. Halbert joined the company in 1945 as assistant to the general attorney, J. Harold Merrick, who resigned Feb. 1. During the war, Mr. Halbert was with the executive office of the Secretary of the Navy, Office of General Counsel, where he served as counsel of special devices division.

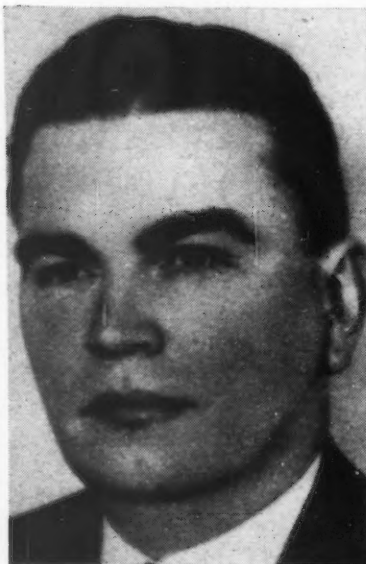
• **H. W. Cobb** has been appointed office manager of the Cleveland warehouse by Norton Co., Worcester, Mass., effective Apr. 1. Mr. Cobb will succeed **E. D. Linton**, former Cleveland office manager, who returns to Worcester to join the staff of the company's merchandising engineer. **R. V. Bergstrom** has been named abrasive engineer in the Cleveland area to fill the vacancy left by Mr. Cobb. Mr. Bergstrom was formerly field engineer for the Cleveland district. **E. J. Lalor** has been assigned as abrasive engineer in the Erie, Pa. territory by Norton Co., succeeding **J. L. Moser**.

• **W. T. Stratton** has been appointed director of purchases of the Wickwire Spencer Steel Div. of the Colorado Fuel & Iron Corp., and will be located in Buffalo. He replaces **E. A. Johnston**, who has resigned. Mr. Stratton started his career with the United Alloy Steel Corp. in 1916. In 1929 the United Alloy Steel Corp. merged with the Republic Steel Corp. and he continued in the employ of the Republic Steel till 1944, when he joined the Valley Camp Coal Co. as district manager.

• **E. W. Heffernan** has been appointed manager of the new Philadelphia sales and service office of Wheelco Instruments Co., Chicago.

• **William M. Hillborn** has been elected president of Cribben & Sexton Co., Chicago, succeeding **George D. Wilkinson, Sr.**, who retains the position of chairman of the board. **Thomas H. Heneage** has been elected vice-chairman of the board, and **Sidney R. Hill** has been named controller. **George D. Wilkinson, Jr.**, secretary of the company, has also been made a member of the board of directors. **Wendell C. Davis** was reelected vice-president and treasurer.

WILLIAM M. HILLBORN, president, Cribben & Sexton Co.



• **Forrest A. Marsh** has been appointed assistant to the vice-president in charge of sales of National Tube Co., Pittsburgh. He succeeds **James B. Graham**, who is retiring. Mr. Marsh began with National Tube as a machinist's helper in 1924, and held various mill positions until 5 years later, when he was appointed field engineer. He became a division sales manager at Houston in 1936, and has been manager of the company's sales office there since 1944. Mr. Graham started with National Tube in 1905 at Lorain, Ohio, and held positions successively as chief of inspection, oil field representative, and superintendent of field work and inspection prior to 1936, when he was named assistant general manager of sales in Pittsburgh. He became assistant to the vice-president in charge of sales last year.

• **Dr. George H. Spencer-Strong**, director of research of the Pemco Corp. since 1942, has been elected a vice-president. Coming to Baltimore in 1934 he accepted a job with the Pemco Corp. in their laboratories. In 1936 he was advanced to the post of assistant director of research, and in 1942 was appointed director of research, the position which he will continue to hold in addition to his new activities as vice-president.

• **George E. Holland** has been made president of the Union Twist Drill Co. of Athol, Mass. For 25 years he had been with the Butterfield division of the company.

• **R. G. MacDonald** has been appointed vice-president and director of public relations at the Geuder, Paeschke & Frey Co., Milwaukee, to succeed **H. Herman Rauch**, resigned.

• **A. S. Capron, Jr.** has been appointed Wisconsin sales representative for the U. S. Steel Wire Spring Co., Cleveland, and will make his headquarters at Milwaukee.

• **John R. McGuire** has been appointed sales manager of Waterman Engineering Co., Evanston, Ill. Since his release from the service, he has specialized in the sale of hydraulic equipment in the Chicago area for the Waterman Engineering Co.



RALPH LIBEAU, general purchasing agent, Bassick Co.

• **Ralph LiBeau** has been appointed general purchasing agent of the Bassick Co., Bridgeport, Conn., a division of Stewart-Warner Corp. Mr. LiBeau joined the company in 1945 as sales manager of the automotive and specialty hardware division. He served in that capacity until his transfer and promotion as general purchasing agent. During the war he was with North American Aviation, Inc., of Kansas, where he directed procurement of capital equipment and served in an engineering capacity on internal capital production facilities.

• **Ralph D. Holcomb** has been named general sales manager of Harnischfeger Corp., Milwaukee. His elevation to this new post follows 18 years of continuous service with the P&H organization.

• **Fred A. Maser** has been appointed superintendent of the Shippensburg, Pa. plant of SKF Industries, Inc., which is expected to begin operations July 1. Mr. Maser joined SKF in 1927, as an apprentice tool, die and gage maker. For the last several years, he has been a general foreman in the toolmaking department.

• **Theodore C. Rademacher, Jr.**, former assistant merchandising manager of the Massey-Harris Co., Racine, Wis., has been appointed advertising and sales promotion manager for the Young Radiator Co. of that city.

• **Mrs. Alice Holton** has been appointed publicity director of the Perfection Stove Co., Cleveland. For the past 3 years Mrs. Holton has handled publicity for the Cleveland Community Chest and its numerous agencies. Previously she was on the staffs of the Columbus Dispatch and National Petroleum News and served as assistant editor of publications, Oliver Corp., Chicago.

• **V. Robins Tate**, former vice-president and secretary of the Perfex Corp., Milwaukee, has been elected executive vice-president, and **Hugh Kelly**, in charge of industrial engineering, has been appointed chief engineer.

• **Edward S. Alden, Jr.** has been made treasurer of the Whittin Machine Works, Whitinsville, Mass., to succeed E. Kent Swift, who remains chairman of the board. Mr. Alden had been assistant treasurer.

• **William H. Yeckley**, general superintendent, Brier Hill Works, Youngstown Sheet & Tube Co., has been made general superintendent of the Campbell works steel plant, blast furnaces and Struthers works, Ohio. He succeeds Buford M. Stubblefield, who recently was made manager of the company's Chicago district plants. Mr. Yeckley came to Youngstown Sheet & Tube Co. in 1937 from National Tube Co. at Lorain. **Donald W. Lloyd**, superintendent of the Brier Hill bloom and round mills, Youngstown Sheet & Tube Co., succeeds Mr. Yeckley as general superintendent of the Brier Hill works. Mr. Lloyd came to the company in 1932 from Republic Steel at Warren. **Melvin Shaulis**, assistant superintendent, Brier Hill bloom and round mills, succeeds Mr. Lloyd as superintendent of those units. Mr. Shaulis joined the company in 1933, coming from Newton Steel Co. at Newton Falls. **Graham B. Brown**, seamless tube development engineer, becomes assistant superintendent of the hot mills, seamless tube department, at Campbell works of Youngstown Sheet & Tube Co. This position has been vacant for some time. Mr. Brown began working for the company part time in 1934 and began working full time 5 years later.



JOSEPH G. HOLZSCHUH, sales engineer, E. W. Bliss Co.

• **Joseph G. Holzschuh** has been appointed sales engineer covering the Pittsburgh territory for E. W. Bliss Co. He will be located at the company's newly established office in Pittsburgh. Mr. Holzschuh will be responsible for the sales of mechanical and hydraulic presses, can and container machinery, and replacement parts. Prior to the Bliss appointment, he was in charge of Eastman Kodak's press department.

• **Michael P. Walker** has been appointed general sales manager of the Aluminum Solder Corp., New York. Mr. Walker is manager of the special projects division of Reeves International.

• **Ralph N. Long** has been appointed assistant comptroller of General Motors Corp., Detroit. Mr. Long is in charge of the insurance section of the corporation. He joined General Motors in 1920.

• **W. C. Adams** has been appointed superintendent of production in the engine division of Crosley Motors, Inc., Cincinnati. He formerly was in charge of refrigerator unit production for the past 14 years, and prior to that time was with Pratt & Whitney Machine Tool Co. and the Potter & Johnston Machine Tool Co. When he first moved to Cincinnati he went with the hydromatic division of the Cincinnati Milling Machine Co., and later with King Machine Tool Co.



NEELE E. STEARNS, assistant general manager of sales, Inland Steel Co.

• **Neele E. Stearns** has been appointed assistant general manager of sales for the Inland Steel Co., Chicago. Mr. Stearns has been manager of the department of business procedures and he will be succeeded in that position by **Elliott C. Youngberg**, who has been assistant manager. Mr. Stearns was employed by McKinsey-Kearney Co. for 10 years before joining Inland Steel in 1940.

• **Richard B. Tucker** has been elected executive vice-president and **Donald C. Burnham** and **John A. Wilson**, vice-presidents of the Pittsburgh Plate Glass Co., Pittsburgh. The vice-presidencies to which Mr. Burnham and Mr. Wilson have been elected are new positions. Mr. Tucker joined Pittsburgh Plate in 1929 as manager of plate glass sales. In 1932 he was named manager of glass sales and served in that capacity for 10 years. He was elected to the board of directors in 1942 and made a vice-president of the firm in 1944. Following his discharge as a U. S. Navy lieutenant after World War I, Mr. Burnham served an apprenticeship course in factories and warehouses operated by Pittsburgh Plate Glass. Successively he held positions of assistant manager of the Chicago warehouse and manager of warehousing units operated by the firm at Atlanta, Philadelphia and Boston.

Mr. Burnham has served as manager of plate glass sales since 1940. As vice-president he will be in charge of the merchandising division and all glass sales. Mr. Wilson has been serving as manager of glass manufacture since 1940 and prior to that served as general superintendent of the firm's plate glass plants for a 9-year period. He has been associated with the firm since 1923 when he joined the efficiency department at the Ford City, Pa. plate glass plant. Mr. Wilson, as vice-president, will be the operating head of the glass manufacturing division.

• **H. S. Hersey** has been reelected president and general manager, C. O. Bartlett & Snow Co., Cleveland. **C. J. Neville** has been elected executive vice-president and treasurer of the company. Three new vice-presidents have been named: **B. A. Smith**, vice-president, secretary and director of engineering; **C. O. Bartlett**, vice-president and director of sales; and **H. A. Christy**, vice-president and director of manufacturing. **C. Ralph Willson**, manager of purchasing, and **John Hersey** have been elected members of the board of directors.

• **Clyde E. Rickard**, formerly with Spang Chalfant, has been appointed production manager of McDowell Mfg. Co., Millvale, Pittsburgh. **Charles G. Auchter**, present production manager, has been appointed field representative for the company; and **Eric B. Beckeman**, formerly metals coordinator for the Aluminum Co. of America, becomes industrial engineer.

• **G. F. Maughmer**, assistant manager for the past 2 years and for 22 years with General Electric Co., has been appointed manager of the Los Angeles office of the apparatus department of GE. He succeeds **S. E. Gates** who has retired after 42 years of continuous service with General Electric.

• **M. O. Stockland, Jr.** has been appointed manager of the newly consolidated sales promotion and advertising department of the Four Wheel Drive Auto Co., Clintonville, Wis. He was former sales promotion manager and takes over the duties of **Francis M. Higgins**, who has retired as advertising manager.

• **Benjamin C. Bowker**, chief foreign correspondent of the New York Post, has been named special assistant to the president of Willys-Overland Motors, Toledo.

• **Hugh Porter** has resigned as deputy director of the Civilian Production Administration's Bureau of Construction and Field Operations, in order to take a position with the Lustron Corp. in Columbus, Ohio. Mr. Porter has been with CPA and its predecessor agencies since 1941.

• **Sidney G. Larkin**, controller for Briggs & Stratton Corp., Milwaukee, has resigned to become comptroller for the Joy Mfg. Co., Pittsburgh.

• **Robert Russell**, assistant sales manager of Westinghouse Electric International Co., has been elected a director of the Sterling Engine Co., Buffalo.

OBITUARY...

• **Edward F. Entwisle**, 64, general manager of Bethlehem Steel Co.'s Lackawanna, N. Y. plant since 1936, died Mar. 8 after an illness of several years. He had been 33 years with Bethlehem Steel and in that time had filled executive positions in most of the company's major steel plants.

• **Robert D. Crowe**, 41, service engineer for the Cummings Machine Works, Boston, died recently.

• **Arthur G. Green**, 51, sales manager for the Bay State Abrasive Products Co., Westboro, Mass., since 1944, died Mar. 6. He was with the Norton Co. 27 years prior to becoming affiliated with the Westboro concern.

• **James W. Atkinson**, 64, sales representative of Detroit branch, Reliance Steel Div., Detroit Steel Corp., Detroit, died Feb. 23, after a brief illness. Mr. Atkinson had been continuously associated with the company since 1923.

• **John H. Allen**, 89, founder and president of Everlasting Valve Co., Jersey City, N. J., died Feb. 18. He was in active management of the company until recently.

Lindberg Hyen Hy-
drying Generator.
750 CFH.

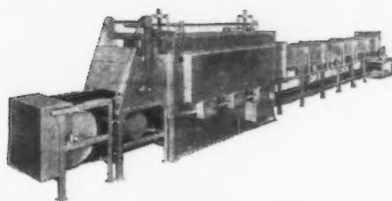


You can now
**COPPER BRAZE
HIGH CARBON
STEEL...**
without Decarburization!

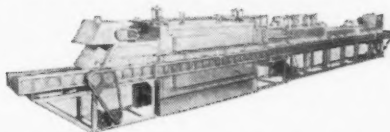
Do you have a job that calls for brazing high carbon steel parts,—without decarburization? Investigate the possibilities of Lindberg Brazing Furnaces,—with the Lindberg Hyen Hydrizing Atmosphere Generator.

LINDBERG HYEN HYDRIZING ATMOSPHERE eliminates decarburization. This is possible because the HYEN generator employs a new design principle in the endothermic cracking of city, natural, propane, or butane gases. A refractory retort is used which permits much *higher cracking temperatures* than ever before used,—thus decarburizing constituents (carbon dioxide and water vapor) are eliminated.

The Hyen is a versatile as well as a precision generator,—can be set to be in equilibrium with any carbon content steel. Once set, atmosphere analysis remains constant, and will not drift.



Lindberg Mesh Belt Conveyor Brazing Furnace. Work chamber 20 inches wide, 8 feet deep, 10 inches high. Cooling chamber 24 feet. Work capacity: 450 to 700 gross lbs. per hour.



Lindberg Roller Hearth Conveyor Brazing Furnace. Work chamber, 18 inches wide, 9 feet deep, and 1 foot high. Cooling chamber, 36 feet. Work capacity: 750 gross lbs. per hour.

LINDBERG BRAZING FURNACES are especially designed to prevent infiltration of air. Consequently decarburization is eliminated because furnace atmosphere is maintained with the same degree of purity at which it was generated.

Lindberg Brazing Furnaces need *never be cooled* for element maintenance. Globar elements may be replaced from *outside* the furnace.

Bulletins 190, "Lindberg Controlled Atmospheres"; 201 "Lindberg All Purpose Brazing Furnaces" and 210, "Lindberg Continuous

Production Brazing Furnaces" are available on request. Lindberg Engineering Co., 2452 W. Hubbard St., Chicago 12, Ill.

LINDBERG  **FURNACES**

Dear Editor:

GI GRIPE

Sir:

As publishers of one of the larger industrial song sheets, we fail to see anything instructive or wise to present day unrest caused by the De Beau (probably means Bedaux—Ed.) system which was the great helpmate of Hitler and which was very successful in ruining English industry, where today the mines are not allowed to run with moderate machinery as in this country. Thanks to General Eisenhower who nabbed De Beau (Bedaux?—Ed.) in the African campaign and who said he and his systems never were any good. You would not dare to print industrial conditions as *Life* does in the Dec. 23, 1946, issue. There you can see for yourself that American labor is tops over all other labor. Here they do not have workers pitted against worker, neither do they have hypercritical time study methods or some other \$64 joke. These men prove to America, although trade publications ignore them, that this system is the American way of life. We know that a reputable firm in Chicago made surveys for industries in the East and especially found one where they reported that the first aid man practically knows what he is up against—as for the rest of the supervisors, it is a disgrace. Another one was found where the firm put the efficiency men in supervisory positions at big salaries and have the unity of the workers at such a low ebb that it is a disgrace. At neither place, after money was spent to find out the pitfalls, were any changes made. All that they are doing is waiting for the economic crisis which industry is planning to force on America.

We boys know that we are in for this Mortimer Snerd supervision in industry: that is what we fought for. And the industrial press which could avoid this smash is keeping its column so tight that when it is here they want to correct the evil which we know was knocked for a row in the African campaign. But remember we watch all industrial papers and we see no guiding or instructive suggestions coming out of same to keep American industry straight. We are well able to give you spots clear across the continent and we know that industry is up for a cleansing and there are a few who already are reading the handwriting. Labor does not want 50-50 basis as a whole. What labor is out for is that when the rainy day comes, there is a surplus here for industry to readjust itself. Industry must have profits and are rightly entitled to same. But

above all they must come back American and stay American. We watch your copies same as other copies of industrial advice.

THE G. I.'S FOR CLEAN
AMERICAN INDUSTRIES
Reading, Pa.

BIMETALLIC THERMOSTATS

Sir:

... We would like to have a list of the firms which produce bimetallic and bellows-type thermostats suitable for the operation of a small mechanical appliance through temperature variations. Also we would like to know of books published on the design of fluid-filled bellows type thermostats as well as bimetallic thermostats ...

PAUL K. BEEMER
Chief Engineer

Preco Inc.
Los Angeles

Names of several concerns engaged in the manufacture of bimetallic and bellows-type thermostats are being forwarded to you. Referring to your second request, "Temperature—Its Measurement and Control in Science and Industry," published by Reinhold Publishing Corp., 330 W. 42nd St., New York, 1941, may be of assistance.—Ed.

TOOL STEELS

Sir:

We should like to express our appreciation for your "Directory of Tool Steels." We find it is an almost invaluable aid in our work and is our major reference when matters concerning names of tool steels are involved. We should like to obtain several additional copies of this pamphlet and would appreciate if you could let us know how to get them.

STEWART G. FLETCHER
Chief Research Metallurgist

Latrobe Electric Steel Co.
Latrobe, Pa.

The latest edition of the Directory was published in April 1946 and covers tool, metal-cutting and die steels and sintered carbides. It is available to readers at \$1 for a single copy, \$1.50 for two copies, \$2 for three copies, and 50¢ each for five or more copies.—Ed.

EXECUTIVE POLL

Sir:

In your Sept. 19 issue you published an article, "Executive Poll Shows Human Relations to Be Prime Responsibility." We think this article an excellent one and would like your permission to condense it for publication in our external house-organ, "Modern Employer," in which we are endeavoring to acquaint employers in industry and business with the finest material on the subject of employer-employee

relations ... Full credit will be given your publication ...

PAUL H. BAISCH
Publisher

Executive Publications
Cleveland

We are happy to give permission to reprint the article, but wish to point out the subject matter was the 1945-46 annual report of the American Management Assn., 330 West 42nd St., New York 18.—Ed.

STAINLESS HARDNESS TESTS

Sir:

We are using quite a large quantity of thin sheet stainless steel ... for diaphragms and other applications. The difficulty we are experiencing is in finding information on hardness specifications and hardness testing of this thin material, particularly in finding conversion tables that show corresponding hardness values. Several samples of 0.005 in. thick Type 302 stainless steel with hardness specification reading "one-half hard" were tested on different scales on the Superficial Rockwell tester. Each sample tested consisted of three layers (3 ply). The Rockwell readings with the corresponding Brinell values showed quite different results: 15N scale—71 to 75 (Brinell 245 to 283); 15T scale—89.5 to 91 (Brinell 180 to 200); 30T scale—79 to 80.5 (Brinell 210 to 225). Which one of the scales would be the proper one to use in this case and what would be the correct test method ...

KARL SCHREIBER

Metallurgical Dept.
Detroit Lubricator Co.
Detroit

Hardness measurements on 0.005 in. thin strip at approximately 200 Bhn are probably best made with a Vickers tester using the diamond pyramid indenter and a 1 kg load or with a Tukon tester using the Knoop indenter with 1 kg load. Comparison of these readings with corresponding Brinell values is, in most cases, unnecessary. Direct correlation of the Knoop or Vickers hardness with other mechanical properties such as yield and tensile strength is recommended. The load used in the hardness test should be specified since the hardness number varies with load in these tests. Testing of three layer specimens is generally not recommended.—Ed.

ALUMINUM ROLLS

Sir:

We have noticed in your May 16, 1946 issue, p. 112, a mention of aluminum printing roll tests. We were wondering if you have any further information on these tests since the matter is of great interest to us.

J. R. CHARLTON
Sales Development Div.

Aluminum Co. of Canada, Ltd.
Montreal

Due to the supply demand situation in the domestic aluminum market, we understand research and development activities in this field have been dropped for the time being and there is nothing to report beyond the information in the May 16 issue. However, possibilities in this field are foreseen for some later time.—Ed.

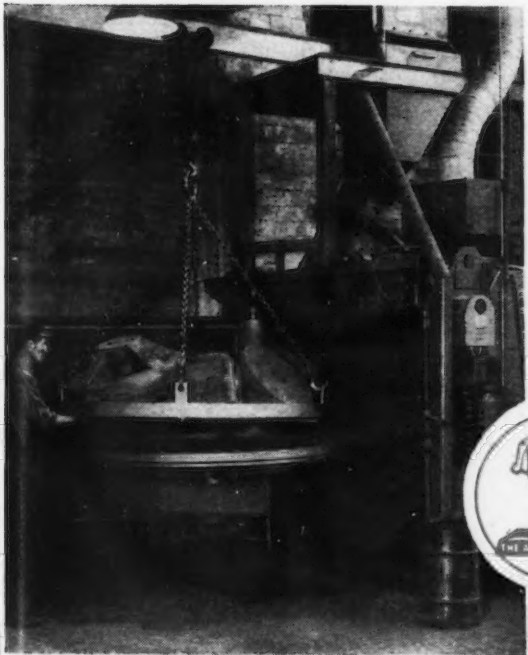
Wheelabrator Case Histories



point the way to *More Profit for you*

Read these typical case histories of Wheelabrator's profit-making performance and see how widely it is being applied to casting cleaning problems of all kinds. Then let us show you by actual demonstration what the Wheelabrator will do on your own products. We believe you will be agreeably surprised at the all-'round savings it will effect for you.

72" dia. Wheelabrator Swing Table used by H. P. Deuscher Co., Hamilton, Ohio.



Swing Table Eliminates Airblast Room and Ten Tumbling Mills

The Western Land Roller Co., Hastings, Nebraska, is using a 66" diameter Swing Table to clean 3 ft. x 4 ft. side frames, pump castings for irrigation pumps and other miscellaneous castings. They formerly used 12 rattling mills and a sand blast room to do this work. They are now running from 10 to 14 tons of grey iron on this table in from 6 to 8 hours.

Wheelabrator Pays for Itself in Savings

A saving of \$23.60 per day resulted by replacing tumbling mills with a Wheelabrator Plain Table at a large Cleveland jobbing foundry. Faster shipments, reduced storage space, and lower handling expenses were also reported.

Wheelabrator Saves \$5,853.96 in Five Months

On one type of casting alone the New York Air Brake Co., Watertown, N. Y., saved \$5,853.96 with a Wheelabrator Cabinet during the first five months' operation. The per-casting cleaning cost of this piece by tumbling was 42.6c. and only 26.5c. by Wheelabrating. This saving of 16.1c. applied to a total of 36,360 castings.

One Man Does the Work of Six

Prior to the installation of a 48" x 42" Wheelabrator Tumbblast the Texas Steel Co., Fort Worth, operated a sandblast room 7 days a week, 24 hours a day. Six sandblast operators were needed. Now, the sandblast room, using one operator, handles only castings too large for the Tumbblast. All other castings are Wheelabrated in eight hours.



American
WHEELABRATOR & EQUIPMENT CORP.
(FORMERLY AMERICAN FOUNDRY EQUIPMENT CO.)
510 S. Byrkit St., Mishawaka, Indiana

Industrial News Summary...

- Price Complaints at High Level
- Supply Source Changes Looming
- Extra Reductions Aid Consumers

MORE than 68 pct of steel consumers believe that current steel prices are too high and some of these firms have already reduced their order volume because of this situation. Even more important in relation to future steel company sales policies is the fact that more than 36 pct of steel users either expect to change their source of supply or are thinking about it.

The action of Carnegie-Illinois Steel Corp. this week in making a moderate reduction in the delivered price of several steel products is believed to have been a recognition of the present consumer state of mind. These changes which involve the revision of certain extra charges (normally added to the base price) are expected to be followed by other minor revisions in the delivered price of additional products. Furthermore, the action of the U. S. Steel subsidiary is expected to be followed by other steelmakers of the same products.

The most important change announced by Carnegie-Illinois involved a revision of extras on plates which will average about \$2 a ton reduction on that product. The change in steel bar extras will average about \$1 a ton downward for that product. Taken together the saving to the consumer as a result of these two major cuts in the delivered price will exceed \$15 million on an annual basis, assuming other companies fall in line.

CHANGES were also made in the extra charges for structural shapes, alloy semifinished steel, hot-rolled sheets, cold-rolled sheets, long ternes and hot-rolled strip. While these reductions were minor in nature, they represent a definite reduction in the delivered prices of those products, the magnitude of which, however, does not approach the savings in plates and bars.

In no case was the base price of steel products affected in the reductions made this week. The extra charge revisions were the result of a test on the increases made in extra charges last December and early in January. The steel company realistically eliminated that portion of those advances which could not be substantiated by actual production costs.

This moderate decrease in the price of delivered steel may be the forerunner of basic changes as the steel industry attempts to do its part in resisting the current inflationary movement in prices. It is also an indication that the industry will hold out for a moderate wage increase and the evidence still points to no definite action in that direction until the portal-to-portal problem is settled by legislation. There is no chance of a steel industry tieup. If the deadline set forth by the steel corporation and the union is reached before the portal question is satisfactorily settled, it is anticipated that the company and the union will extend their contracts again.

WHILE first quarter earnings in the steel industry are expected to be somewhat higher than in the fourth quarter, a slight damper will be placed upon these figures by the certainty that any subsequent wage agreement reached will entail a substantial retroactive wage bill. It is for that reason that the steel union is content to pursue a conservative method of action, especially when it is more than likely that both sides have reached a definite agreement on the retroactivity of the wage increases to be granted.

While steel consumers were not especially worried during the past few weeks about the size of their inventories, approximately 15 pct reported that demand for their manufactured product is slackening. In some steel centers, however, there was no indication of any important drop in general demand for steel products.

In one major area practically all steel officials are of the opinion that business has never looked so good but at the same time these sources appear to be quite pessimistic about the future. The sustained demand for all types of products has not served to create universal optimism. Many executives who were brought up in a market of stiff competition freely admit that they have lost track of this important factor. They also admit that when business barometers start to fall considerable readjustment in sales policies may be necessary before a normal business pattern is established.

THE past week there continued to be strong consumer demand for nails, wire, fencing and related items. Manufacturers of steel pipe said that on many of their products, bookings have been made solid through 1948 and beyond.

Because of high cost, many projects in the building and construction industry have been abandoned, but in general, activity continues at a high level. Unshipped orders from some major fabricating plants are substantially ahead of backlogs a year ago—in some case the increase is more than 50 pct.

Steel ingot output this week reached a new peacetime peak of 96.5 pct of rated capacity, up one point from last week and there is no indication of any important change from that level.

Scrap markets throughout the country continued strong during the past week. The stiff competition between steelmakers in distant markets for available scrap showed no signs of lessening—in some districts such as Buffalo it was more intense. Small advances occurred in Philadelphia and a slightly higher range in prices was established in Pittsburgh. As a result of these two changes, THE IRON AGE steel scrap composite this week moved from \$38.75 a gross ton to \$39.67 a gross ton, up 92¢ a ton.

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Week

March 11

March 18

• Re

• **GENEVA FREIGHT RATE OKAYED**—A decision in the Geneva Steel rate case was handed down by the Interstate Commerce Commission on Mar. 14 to the effect that the proposed rate reduction would be allowed to go into effect on the expiration of the present suspension on Mar. 31. Meanwhile, the Commission said, it would continue the investigation and call a new hearing at a date to be announced later. In view of the decision, apparently the ICC has not found answers which were wholly satisfactory in last week's hearings.

• **BRITISH STEEL OUTPUT**—British iron and steel production figures for February show a substantial decline compared with a year ago, mainly due to the restriction of fuel supplies and transport difficulties brought about by winter weather. In February this year steel production totaled 924,200 tons, compared with 1,107,400 tons in the same month last year, and pig iron 565,300 tons as against 654,500 tons last year.

• **NEW DUTCH STEEL CAPACITY**—With a market consuming 1.4 million metric tons of steel before the war, The Netherlands was one of the most important steel importing countries in Europe. Due to the absence of imports from Germany, a government commission has proposed the construction of new facilities, including five new blast furnaces. The existing works have a capacity of 300,000 metric tons of pig iron, and 200,000 tons of steel. Various proposals have been suggested to expand the existing works at Ymuiden, erect a new mill on the Limburg coal field using German reparations, or at Sluiskil, where a coking plant was in operation before the war, working primarily for export. The discouraging prospect for reparations of steel rolling equipment if the level of industry for the Ruhr is increased makes the reparations aspect of the problem doubtful.

• **WORLD PRICE HESITATION**—Belgo-Luxemburg producers of steel, who have been obtaining high prices in the seller's market prevailing during the past 18 months, are watching consumers carefully for signs of price hesitation. Some Continental sources state that the first signs of reluctance to buy at greatly exaggerated steel prices have begun to appear, particularly in South America, where some of the highest prices have been paid in the past.

• **CAN SHIPMENTS**—Metal can shipments to packers of all types of products totaled 2,759,519 tons in 1946 according to the Can Manufacturers Institute which cites U. S. Dept. of Commerce figures summarizing can production for last year. This volume, second largest in can making history, was approximately 3 pct less than the volume for the peak year of 1941. It was higher than the 1945 output and 33 pct above 1944 totals. Broken down into categories, the metal containers were rather evenly distributed among packers with the exception of fruit and vegetable cans. The latter accounted for more than 40 out of every 100 cans. Condensed and evaporated milk filled 25 cans. All other kinds of foods took about 25 cans while non-food products got approximately 10 cans out of every 100.

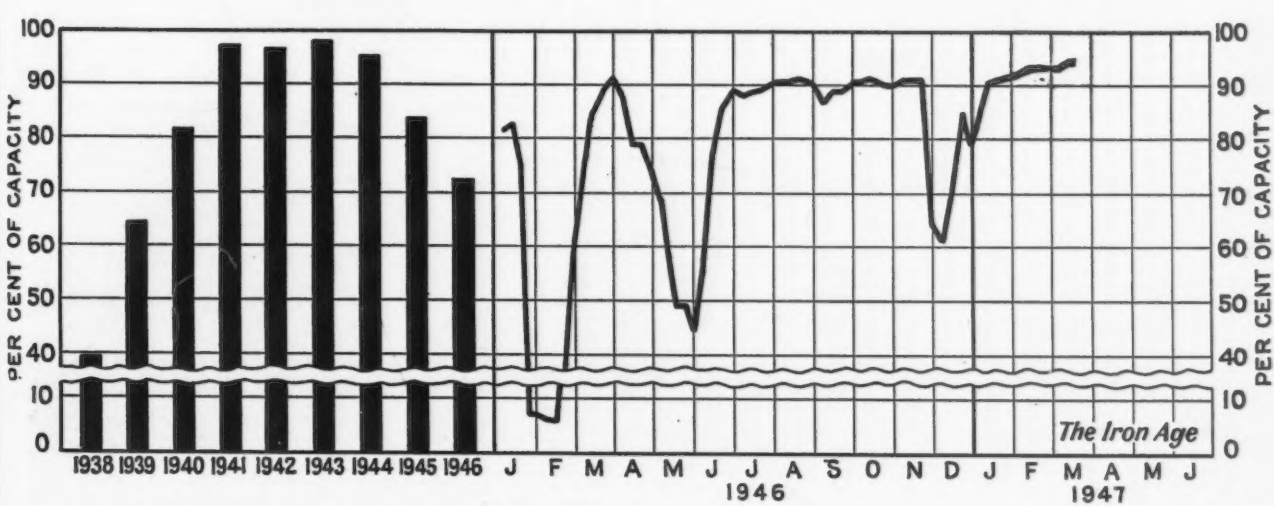
• **MYSTIC PIG IRON**—Mystic is probably the only furnace in the country that has not changed its prices. Any general advance in the market still has some way to go before Mystic's government subsidy will be absorbed. There is no present indication the government will stop subsidy.

• **SOIL PIPE OUTPUT**—January production of cast iron soil pipe was 54,600 tons, an all-time high which exceeded for the first time the 50,000-ton monthly production goal set for the industry.

• **FRENCH ORE PREPARATION**—The Denain and Anzin steel company of France is constructing an ore crushing plant at their Escaudain division to work in conjunction with the sintering plant already located there. The crushing plant is to have a capacity of 500 tons per hr, and is designed to permit a 10 pct to 15 pct savings of coke in the blast furnace.

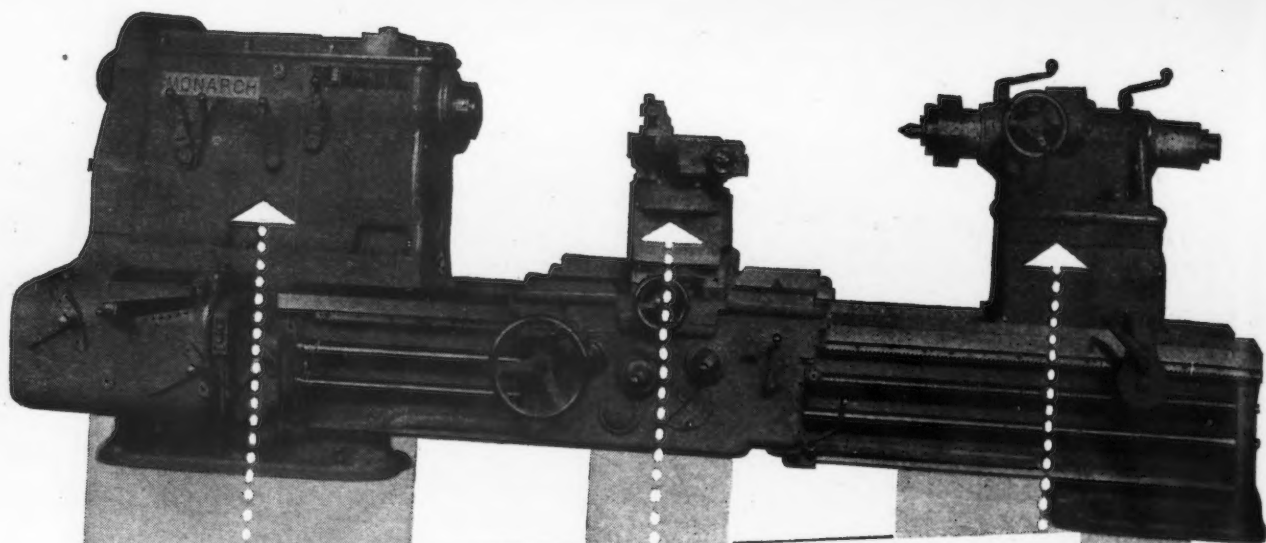
• **SURPLUS ELECTRICAL WIRE**—WAA is offering approximately 40 million ft of surplus government-owned electrical wire and cable worth \$10 million (new cost) on a competitive bid basis. The material was made for the Navy and Maritime Commission and most of it is unused. Although located in most of WAA's regional offices, the largest inventories are held in New York, Los Angeles and San Francisco. Detailed information may be obtained in these offices. No longer subject to priority regulations, the wire and cable are offered f.o.b. location.

Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
March 11.....	98.0	95.5*	90.5	90.5	95.5	104.0	80.0	99.0	104.5	105.0	96.5	76.5	105.0	95.5
March 18.....	100.0	94.5	91.0	90.0	98.0	104.0	100.0	99.0	102.5	106.0	96.5	76.5	105.0	96.5

* Revised.



FOR ADDED SWING — *Economically*

Need added swing for an occasional big part—or for turning shafts with a previously-machined large-diameter section? Is your production mostly modified disc shapes—light cuts on big diameters?

If your answer is yes—for any of these reasons—Monarch has a practical, economical way of giving you that extra swing without the unnecessary extra power and expense of ponderous oversize machines. Let our foundry pour added swing into a new Monarch for you—we can raise the machine in the sand.

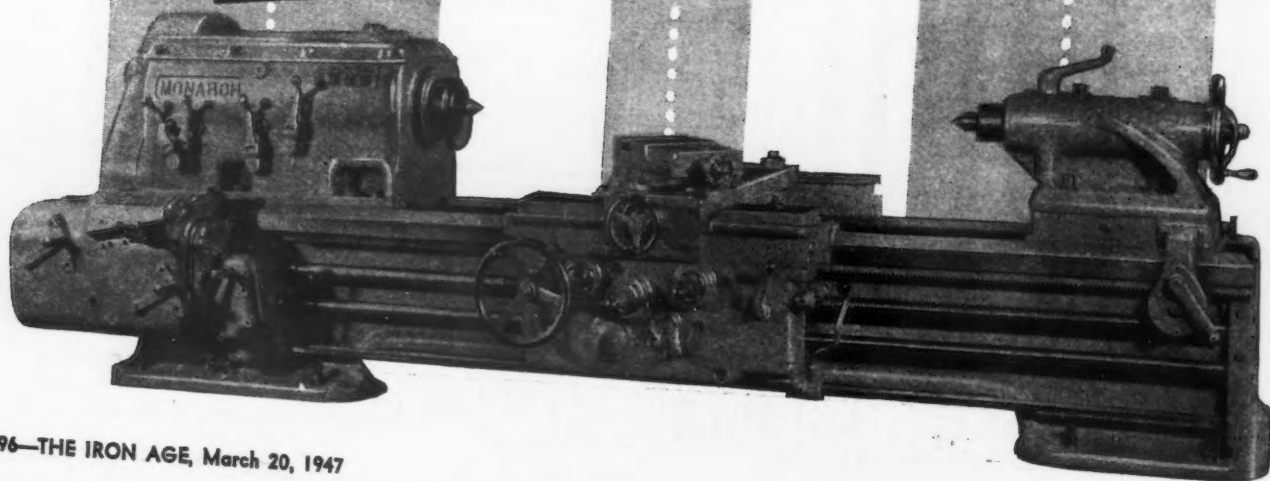
Monarch builds its *standard* machines with the exceptionally wide beds and rugged proportions necessary to give you added swing, without sacrificing normal high production and precision operation. All raised castings are machined in standard jigs and fixtures, this being further assurance of the same accurate performance for which standard Monarch Lathes are famous.

If our application engineer says we can save you money on your regular production, a standard Monarch machine (any size from 12" swing up) will be modified to give you a special-order raised machine that matches your swing requirements. May we send an engineer to talk it over?

THE MONARCH MACHINE TOOL CO.
SIDNEY, OHIO



Monarch
TURNING MACHINES



Many Steel Customers Intend to Change Sources of Supply

New York

••• Some steel companies may have to concentrate on future customer relationships long before steel supplies become easier. This was one fact disclosed in replies received from 595 large metal-working plants in a mail survey conducted during the last week in February and the early part of March.

About one-fifth of those answering THE IRON AGE questionnaire have indicated that they expect to change their source of supply when the present tightness in steel is eliminated. Even more important is the fact that almost the same amount are now thinking about making the change. Some solace, however, should be taken by the industry as a whole when it is considered that almost two-thirds of the steel industry's customers expect to keep on doing business at the old stand.

Although most manufacturers who definitely have made up their minds to change their source of supply classify prices as an important reason for making the change, they also went on record

Buyers Plan to Change When Steel Supply Is Easier; Other Opinions Aired

By TOM CAMPBELL
News-Markets Editor

about the type of service they have been getting, criticized delayed deliveries and to some extent quality of the material received. Only a small portion of this group cited personal relations as a reason for planning a change.

On the important question of "Are steel prices too high?" it might be expected that almost everyone queried would have answered in the affirmative—yet this was definitely not the case. About one-twelfth of those queried stated that steel prices were not too high, while close to a fourth indicated that prices were about right. The remainder, however,

said current steel prices were too high.

Apparently those who felt they were being overcharged on steel have at various times considered whether the prices were high enough to cause a reduction in order volume. In most cases it was apparent that their own demands were so heavy that even though raw material prices were too high, no change in order volume could be made because of this reason. Nevertheless about one-seventh of the manufacturers queried have already reduced their order volume because of prices, while more than a sixth have indicated that they are thinking about curtailing their order volume.

These figures obtained from questioning manufacturers of automotive equipment, machinery, home appliances, containers and other large users of steel are in direct contrast to trade reports indicating no serious objection to prices charged. This difference in opinion, however, is probably explained by the fact that the returned questionnaires were un-

The Shape of Things to Come?



- 1 - Are steel prices too high? Yes---No---About right---
- 2 - Have current prices caused you to reduce your order volume? Yes---No---May soon---
- 3 - Expect to change sources when steel supplies become easier? Yes---No---Thinking about it---
- 4 - If "3" is "yes", why? Service---Prices---Delivery---Personal relations---Quality---
- 5 - Does size of your inventory worry you? Yes---No---At times---
- 6 - Is demand for your product slackening? Yes---No---Is it less than you planned for? Yes---No---

QUESTIONNAIRE: This is the questionnaire which was mailed to 1415 metal-working plants rated at \$500,000 and over. The mailing included manufacturers of automotive equipment, machinery, home appliances, containers and other large users of popular type grades of steel. Replies were received from 595 plants or 42 pct of the total inquiries mailed.

signed and the source of the reply was undisclosed.

In an effort to find out if customers were inventory conscious a general question on the size of inventories was asked. Because inventories mean different things to different people only a general

response was expected. For that reason it was interesting to find that close to 60 pct of steel users were not worried about the size of their inventory. In the majority of cases it was indicated that it was neither too large nor too small.

There is no evidence in the metalworking trade today of any large-scale slackening in demand for manufacturers' products. More than 85 pct denied that there was a falling off in demand of the particular item made by the company which answered the questionnaire. Almost the same number indicated that their plans have been carried out in line with previous expectations. Nevertheless the 15 pct which reported a slackening in demand would take on a more significant aspect if such a percentage was applied to the total steel purchased by metalworking firms.

One feature of the steel consuming survey was the speed with which purchasing agents answered the questionnaire. The bulk of the answers, which represented 42 pct of the total letters sent out, were received within 10 days after mailing.

That some steel companies have already had suspicions that many customers believe there should be a return to normal consumer relationships has already been established. For the past few months a few steel firms have had their salesmen make periodic and exhaustive checks on old customers in an effort to line up business for 1948. These visits have been on the basis of attempting to get back to normal relations.

1. Are Steel Prices Too High?



YES

8.3%



NO

23.1%



ABOUT RIGHT

2. Have Current Prices Caused You To Reduce Your Order Volume?



14.3%



YES



NO

68.2%

17.5%



MAY SOON

3. *Expect To Change Sources When Steel Supplies Become Easier?*



19.3%



YES



63.2%

NO

17.5%



THINKING ABOUT IT

4. *If Answer To "3" Is Yes — Why?*



28.7%



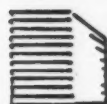
SERVICE

21.3%



PRICES

32.5%



DELIVERY

7.1%



PERSONAL
RELATIONS

10.4%



QUALITY

5. *Does Size Of Your Inventory Worry You?*



23.0%



YES



58.8%

NO

18.2%



AT TIMES

6.A *Is Demand For Your Product Slackening?*



14.9%



YES



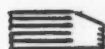
85.1%

NO

6.B *Is Demand Less Than You Planned For?*



12.7%



YES



87.3%

NO

Resumes Certification Of Shipments Under Token Import Plan

Washington

••• Effective at once, the Office of International Trade is resuming certification of shipments under the British Token Import plan of limited quantities of specified iron and steel manufactures, aluminum and manufactures, industrial machinery, agricultural and garden machinery and equipment, and other commodities.

Certification was suspended a month ago while procedures were being revised. As of Mar. 12, there were 184 items on the approved list and more will be added from time to time.

Under the Token plan, manufacturers or exporters with established prewar trade connections may ship a yearly amount not to exceed 20 pct of the average value of the specified items shipped during the prewar years of 1936, 1937 and 1938.

Upon approval of applications, OIT will issue scrip to the exporter who forwards it to his British importer for use in obtaining his import permit. Scrip applications received prior to Apr. 30 will be considered for full annual quotas; scrip issued for 1947 will be accepted by the British Board of Trade through February 1948.

Application forms may be ob-

tained from any field office of the Dept. of Commerce. Included among the items which may be exported under the Token plan are:

Iron and Steel Manufactures. Metal furniture other than domestic; machine knives; nails and staples; pipe joints except malleable cast iron; bolts and nuts except precision; precision screws; rivets; axes; locks; padlocks, keys and key blanks; slide fasteners; woven wire cloth and meshing; gasoline and kerosene pressing irons; carpet sweepers and parts; domestic cutlery including spoons and forks; and domestic hand-operated meat mincers and coffee mills.

Industrial Apparatus. Gear transmissions and gears; mechanical valves; and pulley blocks.

NLRB Lifts Its Ban On Foremen's Cases

Washington

••• The National Labor Relations Board partially lifted its moratorium on foremen's cases on Mar. 13 as a result of the Supreme Court decision in the Packard case, which upheld the right of foremen to organize and be recognized as collective bargaining units.

The Board will now process foremen's cases in which hearings had already been started before

Agricultural and Garden Equipment. Cultivators, forks, hoes, rakes, lawnmowers, milk churns, milk cans and pails, and milk strainers.

Aluminum and Manufactures. Aluminum and aluminum alloys in sheets; disks, wire tubes, rods, angles, shapes and sections; cooking utensils; kitchen utensils other than cooking; and aluminum beer barrels.

Electrical Machinery. Domestic refrigerators, washing machines, vacuum cleaners, and parts; cooking and heating appliances and parts; domestic fans with motors; meters, fixtures, switches, batteries and bulbs.

Miscellaneous. Outboard motors, tire chains, sporting guns and parts, ice and roller skates, and paper machine wires.

the moratorium of Jan. 9; also those in which hearings have been completed and are awaiting issuance of indeterminate reports; and those which are awaiting Board determination.

The Board will confine the processing of foremen's cases to the above categories for at least 60 days. In addition, new supervisory employee cases will not be acted upon during this period.

These limitations are due to the budgetary situation of the Board and the current backlog of over 5000 cases.

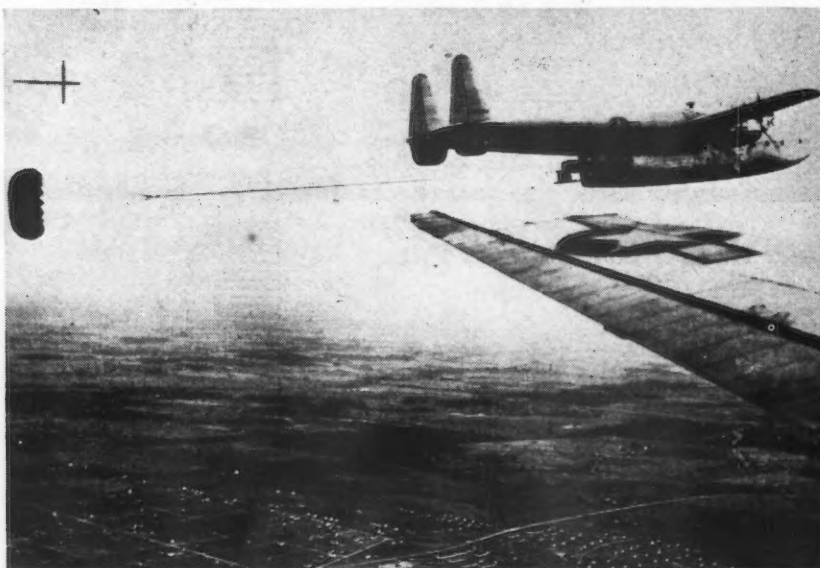
To Hear Cement Case

Washington

••• The Supreme Court on Mar. 10 agreed to hear arguments in the Federal Trade Commission's case against the Cement Institute and producing companies in the industry. This case, which involves the multiple basing point system, was lost by FTC in the Seventh Circuit Court of Appeals last fall. FTC on Jan. 21 asked the Supreme Court for a writ of certiorari and the Court approved the request last week. The court will probably hear arguments during the current session, but it is not likely that the calendar will permit this before May.

FTC has stated that this case is one of the most important in the 30 years of its existence and believes that if the court finds in its favor, practically all basing point price systems will be outlawed.

THE BIG PULL: The first phase of a major unloading operation as the AAF drops a 2240-lb howitzer from a Fairchild C-82 "packet." Here a small parachute pulls the artillery piece from the plane's back door. Once out, a 90-ft ribbon chute opens up and both chutes operate to lower the howitzer.



Carnegie-Illinois Steel Corp. Reduces Some Extra Charges

Pittsburgh

• • • Adjustments of extra charges on a variety of steel products by Carnegie-Illinois Steel Corp., this week resulted in a substantial reduction in the delivered prices of these products. Products included in the extra charge revisions were plates, structural shapes, semifinished (carbon) alloy bars, alloy semifinished, hot-rolled sheets, cold-rolled sheets, vitrenamelizing sheets, long ternes, and hot-rolled strip.

The changes in the plate and bar extras were the most extensive, and observers indicate that these alterations will mean an average reduction in the delivered price of plates totaling about \$2 a ton and in the price of bars the reduction will average \$1 a ton.

On plates, Carnegie-Illinois eliminated the classification extra on specified chemical ranges. This extra was \$2 a ton. Where physical requirements are specified, the extra has been reduced from \$2 a ton to \$1 a ton. Where both chemistry and physicals are specified, the extra has been reduced from \$4 to \$2 a ton. Gage extras on $\frac{1}{4}$ and $\frac{3}{8}$ in. plate have been reduced \$1 a ton, while on 0.180 to $\frac{1}{4}$ in. plate, the reduction totaled \$2 a ton. The spread of 0.15 to 0.30 pct carbon on which no extras apply has been widened to 0.12 to 0.33 pct carbon, and extras for over 0.33 pct carbon have been reduced.

Spheroidizing and annealing extras have been reduced from \$30 to \$20 a ton; and the pickling extra on plates under $\frac{3}{8}$ in. thick has been reduced from \$12 to \$8 a ton. Quality extras have been reduced by \$1 a ton to coincide with the changes in the classification extras. The extra for cutting circles from plates has been reduced.

Plate width extras have been changed, with the base gage on which these extras are established being reduced from $\frac{3}{8}$ in. to $\frac{1}{4}$ in. This permits a substantial price reduction in specific plate sizes. For example, the price of

Revisions Bring Recent Changes Into Line With Actual Production Costs

By T. E. LLOYD

Pittsburgh Regional Editor

plate $\frac{1}{4}$ in. thick by 80 in. wide carried a width extra of \$4 a ton. This, a popular size, now carries no width extra. However, on some few specific gages and widths, this change resulted in a minor increase in cost.

The second most important item from a tonnage standpoint that came up for extra charge revisions was bars. The size extras on bars were adjusted to conform more realistically to what experience of the past 3 months has evidenced. On small bar sizes, the size extra actually increased the cost. For example, $\frac{1}{4}$ in. bars shows an increase in the size extra of \$2 a ton. On $\frac{1}{2}$ in. bars, there is no change. However, on larger sizes up to about 2 in., the size extra revisions reduced the price. The extra on 1 in. bars was reduced to \$2 from \$3 a ton; $1\frac{1}{2}$ in., bars from \$3 a ton to no extra at all; and on 2 in. bars the extra was reduced to \$2 from \$3 a ton.

The extra for 0.10 to 0.60 pct silicon, where the carbon is under 0.28 pct, was reduced from \$8 to \$3 a ton. The same extra for bars with carbon over 0.28 pct was eliminated entirely. It had been \$5 a ton. The normalizing extra on bars was reduced from \$15 to \$10 a ton, while the length extras were cut.

Changes in extras on semifinished products were confined to reductions in the charges for specified silicon of 0.10 to 0.60 pct. Where the carbon range is under 0.28 pct, the charge has been reduced from \$5 a ton to \$3 a ton, and on carbons over 0.28 pct the charge has been eliminated. It had been \$2 a ton.

On structural shapes, changes in the extra charges were con-

fined to widening the carbon range upon which no extras apply. This range was changed from 0.15 to 0.30 pct carbon to 0.12 to 0.33 pct carbon. Also, adjustments were made where carbon extras applied over this range. For example, where 0.40 pct carbon is specified, a \$2 a ton extra rather than \$4 ton extra applies. On 0.60 pct carbon, the extra was reduced from \$5 to \$4 a ton.

The extra changes on the alloy products will generally conform to the changes made in the carbon steel extras. The same size extra charges will likely apply, and there will be no changes in the grade extras. On hot and cold-rolled sheets, vitrenamel sheets and long ternes, the chemical extra charges will be brought into line with the charges made on other products. Also, extras on short lengths of sheet, 5 ft and under, have been increased. On cold-rolled sheets, there has been a differential in the processing extras. Up to 21 gage sheet, one extra has been applicable and over 21 gage another extra has applied. This differential has been eliminated. A general reduction in the extras on pickling for hot-rolled strip has also been made.

This adjustment of extra charges made by Carnegie-Illinois Steel Corp., will likely be adopted by other producers of these products. They are the result of experience gained under the new pricing set-up as established 3 to 4 months ago. The changes in the extra charges are an adjustment to correct inequities and unbalance in the price pattern that resulted from the widespread and sweeping increases made in December and January.

Some observers feel that further changes in extra charges on these and other products are still to be made. Generally, it is anticipated that any changes forthcoming, along with these, will result in a decrease rather than an increase in the delivered cost of steel.

Supreme Court Rule on Foremen Meets with Mixed Reactions

Washington

••• The Supreme Court's 5-4 opinion of Mar. 10 upholding the right of foremen or supervisory employees to unionize and be recognized by employers as collective bargaining units met with varying expressions in Congress. Whether or not legislation will be enacted on this hot issue is still undetermined. There have been indications that Congress will bar foremen and supervisory employees from joining unions. If not, the decision whether confined to affiliate or independent unions will be far reaching in industry, according to opinion here.

Both the majority opinion, written by Justice Robert Jackson, and the dissenting opinion, written by Justice William O. Douglas, were strongly worded, reflecting the feeling proponents and opponents have on the subject. Interestingly enough, Justice Jackson is listed with the so-called conservative wing and Justice Douglas with the liberal wing.

But opinions growing out of the decision were mixed. Sen. Robert A. Taft, R., Ohio, Chairman of the Senate Labor Committee, said he still is in favor of revising the Wagner Act to relieve employers of any obligation to bargain with foremen's union. Sen. Joseph H. Ball, R., Minn., and Sen. H. Alexander Smith, R., N. J., are co-authors with Senator Taft of a bill to accomplish this purpose.

"The court is just in interpreting the law as it stands," said Senator Taft. "The pending legislation would change the law."

On the House side, however, there were Republican members of the House Labor Committee who said there is considerable support for allowing foremen to have unions of their own, but prohibiting them from joining unions of rank and file workers. This declaration was made by Reps. Ellsworth B. Buck, N. Y.; Charles Kirsten, Wis., and Richard Nixon, Calif.

If this sort of legislation is enacted the Supreme Court decision would be sustained by Congress in the case it directly passed upon—the Packard Motor Car Co.,

Majority Opinion and Minority Findings Sharply Worded; New Laws Probable

• • •

which was in the courts for 3 years. The union which won its case, the Foremen's Assn. of America, was an unaffiliated organization. On the other hand, such legislation if passed would mean that another heated court case involving the Jones & Laughlin Steel Corp. against District 50 of the United Mine Workers, an AFL affiliate, would be won by the company.

District 50 has asked the right to bargain collectively for foremen of the captive mines of the steel company. The National Labor Relations Board which after reversing itself held that both the unions in the Packard and J&L cases were proper collective bargaining units. The board made no distinction on the point as between an affiliated and unaffiliated union.

Reviews Labor Relations

Washington

••• Two reports concerning government, industrial and labor relations during the national emergency have been completed and published. In general, they review the experiences of the WPB and CPA during and after the war.

Labor problems encountered during national defense and early war mobilization are outlined in Special Study No. 23 entitled "Labor Policies of the National Defense Advisory Commission and the Office of Production Management, May 1940 to April 1942."

In the other, the history of the formation and early operation of industry and labor advisory groups is recounted under Special Study No. 24 entitled "Industry and Labor Advisory Committees in the National Defense Advisory

Justice Jackson was caustic in criticizing the NLRB. He declared that if we were obliged to depend upon administrative interpretation for light in finding the meaning of the statute (Wagner Act), the inconsistency of the Board's decision would leave us in the dark.

In the bluntly worded dissent—in which Chief Justice Vinson and Justice Burton concurred—Justice Douglas held that if foremen were permitted to organize, such rights could not be denied superintendents, managers, vice-presidents and all levels of management. Such a move, he warned, tended to erase the line between management and labor and thus make the opposing forces within industry not management and labor as heretofore but the operating group on one hand and the owner (stockholder and bondholder) on the other. This, he said, played into the hands of some labor leaders who thought "that if those in the hierarchy above are unionized, they will be more sympathetic with the claims of those below them."

Commission and the Office of Production Management, May 1940 to January 1942."

To Handle Wage Violations

Washington

••• Jurisdiction over wage violation cases formerly under the jurisdiction of the National Wage Stabilization Board has now been assumed by the Salary Stabilization Unit of the Bureau of Internal Revenue.

This includes all pending cases under the now terminated NWSB as well as newly reported cases, Commissioner Joseph D. Nunau, Jr., said. It will not be the policy of the Unit to reopen any case closed by the former Board.

No date has been set for the final liquidation of the Unit since not all investigations of alleged violations have been completed.

Weekly Gallup Polls . . .

Public Believes Government Spending Can Be Cut

Princeton, N. J.

• • • In a poll taken while Congress tussled with the problem of the budget, a majority of voters throughout the nation feel sure that the government can cut spending without impairing present functions and services.

The proportion who think the cut can be made runs better than six out of every ten among the voting population, according to George Gallup, director, American Institute of Public Opinion.

On another aspect of the same issue—just where the cuts should be made—the people are as vague as many a congressman.

The public's ideas here are limited to very general suggestions for the most part—"Cut down on bureaus," or "cut down on employees . . ."

Very few among the total number who felt cuts could be made had any specific suggestion such as military cuts, or budget reductions for a specific civilian department, activity, or service.

In making the poll, the institute asked the people:

"Do you think the United States Government can cut its spending without doing away with activities which you think are necessary?"

	Pct.
Yes	62
No	21
No opinion	17

The way voters feel varies quite sharply with their political preferences and with the amount of schooling they have had.

While a majority of Democrats believe that spending can be cut, it is a majority much less impressive than that existing among Republican voters on the same question:

This is shown in the following table:

	Yes Pct.	No Pct.	No Opin. Pct.
Democrats	52	29	19
Republicans	72	14	14

Voters questioned who have had college training are much more inclined to think the government can cut expenses than is the case with voters who did not

go beyond grammar school in their formal training:

	Yes Pct.	No Pct.	No Opin. Pct.
College	76	19	5
High School	65	23	12
Grammar School or Less	56	20	24

It should be especially noted that the present question does not reflect public feeling toward any one of the many proposals which have been offered to cut the budget below the one approved by President Truman. Today's poll merely reflects a widespread public belief that public spending can be cut.

• • • The fight over the appointment of David E. Lilienthal as head of the Atomic Energy Commission has attracted a lot of attention.

About three out of every four among the voting population have either heard or read about the dispute.

A majority of the voters who have followed the case say they think Lilienthal ought to get Senate confirmation.

If the people who, while following the issue, have no opinion on it are eliminated—as they would be if a referendum on the issue were held—then the vote favoring Lilienthal's appointment runs three to one.

These figures are based on early returns from all sections of the country, in a nationwide poll asking:

"Have you heard or read about the dispute over the appointment of David E. Lilienthal as head of the U. S. Atomic Energy Commission?"

The replies:

	Pct.
Yes	73
No	27

The people who say they have heard or read about the dispute were then asked:

"Do you think the U. S. Senate should or should not approve Lilienthal's appointment?"

The replies:

	Pct.
Should approve	52
Should not	16
No opinion	32

Voters Want to See Lilienthal Confirmed; Ten Most Admired People Named by U. S. Public

• • • Gen. Douglas MacArthur and Gen. Dwight D. Eisenhower are the two men who head the list again this year of living people admired most by the U. S. public.

This is on the basis of a poll of the nation in which voters in all walks of life were asked:

"What person living today in any part of the world do you admire most?"

Here are the first ten on the list—in order of frequency of mention:

- (1) Douglas MacArthur
- (2) Dwight D. Eisenhower
- (3) Winston Churchill
- (4) Harry S. Truman
- (5) George C. Marshall
- (6) Eleanor Roosevelt
- (7) James F. Byrnes
- (8) Pope Pius XII
- (9) Sister Kenny
- (10) Thomas E. Dewey

The above list stands as a highly revealing reflection of the American mind. It will provide interesting material for the sociologist and for students of the public mind in this country.

Students will find it significant that the first ten includes no great industrialist or businessman, no famous educator, or scholar, or scientist, no name popular in sports or the theatre. In fact, these people are all, with one exception, in some aspect of public affairs. The lone exception is Sister Kenny.

It is also interesting to note that three of the top ten are from outside the United States—Churchill, Pope Pius, and Sister Kenny.

Some changes have taken place in the top ten since last year. There are three newcomers—George C. Marshall, Pope Pius XII, and Sister Kenny.

The three not included in the

(CONTINUED ON PAGE 150)

"Crisis" Called Exaggerated Term for Britain's Present Plight

London

• • • Too much has been written in the past 6 weeks concerning the direful future of Great Britain. The implications of today's difficult economic position here were realized during the war, but a growing dissatisfaction with the efforts of the Labor Government to avoid disaster has resulted in what is commonly described in the press as a crisis.

There are some officials who feel certain that the indiscriminate use of the word "crisis" to describe today's situation in Britain has exaggerated the true picture, but the untimely assistance of a hard winter has certainly exaggerated 1947 discomforts for the English people. The blizzards have also served to precipitate an acute coal shortage, and all of the above factors have combined to send the British people into an orgy of soul searching self-examination.

Taking into consideration as many of the complex factors as possible, the situation in Great Britain may be analyzed under three headings at the present time:

What is the crisis?

It appears to the British people that most of the good things of life are unavailable. The government's export drive has made the phrase "for export only" an anathema to the average British shopper. Although there is no starvation, there is certainly a serious lack of variety in the diet, with an extreme shortage of all types of fats and meat. In other lines of consumer goods the shortages are even more serious. Tobacco is hard to find, automobiles are promised on 2 or 3 years' delivery, and electrical appliances are going to overseas markets exclusively.

The first 2 months of this year have been characterized by a series of power cuts which have blacked out the streets again, and limited domestic consumption. Staggered hours are now being arranged in industry. The best that the Labor Government is able to promise in this situation is that with luck there will be no more cuts in food rationing, and that if consumers are cautious no formal system of

But Hard Winter Accentuates Shortages of Exchange, Food, Coal and Labor

By JACK R. HIGHT
European Editor

fuel rationing for domestic consumers will be necessary.

Despite high income taxes (40¢ on the dollar) postwar inflationary pressure in Great Britain is acute, and latest government estimates are that for \$24 billion of goods available during this year there will be \$28 billion in money available to spend.

The shortages in the life of the British citizen may be attributed to several factors, part of which are a direct outcome of the war, and others which existed before the war and have been accentuated by it. It is impossible to look at any industry as a unit and try to understand even the problems of that industry alone, as shortages of raw materials, labor, modern capital equipment, and technical management interlock the whole British economy.

Raw material shortages are due to reduced world supplies, for most of Britain's raw materials are imported, and to Britain's lack of foreign exchange to maintain its balance of imports. The lack of foreign currency is due to a low level of exports caused in part by a shortage of labor.

One of the pressing problems is the general lack of foreign exchange. It would be doing Britain an injustice to ignore the fact that one of the fundamental causes for this lack of foreign exchange is the absence of income from foreign investments. In the days of 1940 when Britain was financing its war on a cash and carry basis, foreign investments were sold indiscriminately to pay for armaments. At the present time in an effort to write off debts which Britain owes to Argentina, Brazil, Egypt, India and other countries still more foreign investments are being exchanged against these debts. Thus

Britain's railways in Argentina and investments in Brazil have already gone by the board.

In the complicated transfer of sovereignty to India, leaders of that country expect to acquire most of the huge British industrial investments by the same means. These transfers will serve to make Britain's need to expand exports more acute, so that there may be a time when the government's target figure of 175 pct of the 1938 level of exports may be totally inadequate.

A more pressing aspect of the foreign exchange shortage is the limited supply of Canadian and American dollars which are available for British imports. Normally Britain imports foodstuffs from soft currency areas, but, due to the poor crops in so many European countries, it has been necessary to purchase from America.

It would be possible to go on in greater detail and dramatize the full extent of the crisis, but it should suffice to say that in last week's 3-day economic debate in the House of Commons the brightest future the government could promise to the people was a long term reduction in the standard of living, and the grim promise of the Prime Minister that "things are going to get worse before they get any better."

Accomplishments in the past 18 months:

The approach of the government to these problems has been a planned economy with a 5-year extension of wartime controls on prices, production, new construction, imports and exports, and the continuation of rationing. A tepid production drive has been instigated by the government. The export goal mentioned above was set for a long term period, and the 1947 goal of 140 pct of 1938 output was established. In keeping with its socialist character, considerable attention has been given by the government to improving working conditions in all industries, but particularly the coal mines, and working parties were established to study a few of the most obviously sick industries in Britain.

Short of coercion, everything

possible is being done to increase the British labor force and to direct it into essential work. A difficult mental hurdle is being faced by British industry and labor from the classic viewpoint that labor is a cheap, abundant commodity, to the new situation where labor is relatively more expensive and in acutely short supply. Serious difficulties have been encountered in obtaining trade union agreement to the importation of substantial numbers of foreign workmen, but the government continues its efforts to bring about such importation.

In a special effort to attack the economic problem at its most vital point, the government is devoting a great deal of attention to the coal mines. From its prewar position of the world's greatest coal exporter, England has degenerated to the awkward plight of producing insufficient tonnages for its own needs. Volumes have been written about what is wrong with the British mining industry, but maintaining the labor force and increasing productivity appear to be the most urgent problems at the moment. The wastage of miners has been proceeding at a terrific pace, and the ardent government recruiting drives are running a losing race against the grim declarations of miners' wives that their sons shall not go down in the pits.

There has been abundant criticism in the British press of the lack of mechanization in the coal mines and other British industries, and the obsolescent character of industry in general. The government made provisions in its procurement loan program for the capital re-equipment of British industry, and it was hoped that a large portion of the American loan would be used for new capital equipment.

In addition the government has pushed enthusiastically its program of nationalization of basic industries, despite protests of opposition parties that the socialists polled only 37 pct of the electorate—certainly no mandate for the nationalization of British industry. The Bank of England, the coal mines, civil aviation, and cable and wireless services have already been acquired by the government. The transport industry is on the block at the moment, and the government promises that electricity, gas, oil, and iron and steel will be included in the near future.

Despite the government controls



TANKS INTO SNOWPLOWS: Two jet engines, one on either side of this Valentine tank, cleared 25 miles of Leicestershire road of drifts 5 to 10-ft deep following Britain's March blizzards. The engines, turning at 16,000 rpm, consume 600 gal of oil per hr. The road leads to vital coalfields.

on business, the 6 weeks of abnormal winter weather threw the country into a nearly paralytic state. The government was in the process of producing a white paper outlining the economic plans for the nation, and the advent of the fuel crisis turned the white paper and the economic debate which followed its appearance into an occasion for a thorough airing of all views.

What can be done?

The overall British economic position was clearly stated in the white paper as follows:

"The central fact of 1947 is that we have not enough resources to do all that we want to do."

In 3 days of debate, conducted for the most part above party politics, the government made it only too clear that as far as directing the available labor force to the places where it is required, there is little more that can be done without once more resorting to the wartime expedient of force. With a strong trade union block as its most solid foundation, the government is in no position to take up the direction of labor during peacetime.

The same stumbling block of criticism from the trade unions will continue to make it difficult for the government to increase the total labor force by importing foreign labor. It will be increasingly difficult for the government to maintain the output of the existing

labor force, inasmuch as the unions are pressing forward with their demands for shorter hours. The mines will switch over to a 5-day week from their present 6-shift program on May 1.

The government promises in the white paper to go forward with its program for improving working conditions, and adheres to the trade union viewpoint that the way to get increased coal output is to make the industry a safe and healthy one.

To relieve the pressure of labor for increased wages, the government has announced that its policy shall be to increase take-home pay by encouraging wage incentive plans, and that any wage increases shall be granted only on the basis of increased output per man year. The plan to be announced for 7-day operation in steel melting shops will be an example of this program.

A minimum coal target for 1947 was set by the government in the white paper at 200 million tons, to be exceeded if possible. The government has now abandoned the idealistic principle that as far as rations are concerned all men should be treated equally. It is now a matter of policy that coal miners should be given preference in food and consumer goods. This is an extension of the wholesale bribe which is being applied with success in the Ruhr coal mines.

As a matter of course the opposition parties during the debate demanded that the Socialist Party

should give up its program of nationalization of industry, and the government stoutly refused any such reversal. The opposition argument is that in a time when the government should be fostering national unity it is proceeding on a program that can only serve to divide the country against itself. There are insistent rumors that indicate that the government may in fact be ready to at least defer certain nationalization programs, notably the plan for the iron and steel industry, but no official announcement has been made. With row after row of enthusiastic young socialist members clamoring for the blood of capitalism at every session of the House, the ministers would lose more face than they could afford by publicly admitting a change in plans at this stage.

The single outstanding new idea which the government put forth during the debate was the promise to establish an interdepartmental planning staff. The character of the industrial breakdown during February was such that even the casual observer commented on the need for it. While Sir Stafford

Cripps had developed an excellent export program in the Board of Trade, and Emmanuel Shinwell had worked out his own program in the Ministry of Fuel and Power, and John Wilmot was pushing forward production from his post in the Ministry of Supply, there was little if any evidence that the various segments of British industry had been integrated to the extent that all these programs might be carried forth simultaneously. The distracting rearrangement of the fuel allocation system at the worst of the crisis and the tacit admission of the government that it had gambled on a mild winter and lost, gave ample evidence that coordinated top level planning had been lacking.

The new program calls for the appointment of a super-planner with a joint committee serving under him which will fulfill the missing functions. Presumably his job will be to work out an overall system of priorities for all of British industry, and to insure that the export drive is closely coordinated with the program for domestic consumption. More urgently and more concretely, his job will be to see

that the past winter crisis does not occur to embarrass the government again.

Says Lack of Iron Castings May Cause Steel Demand Drop

Washington

••• Citing the lack of balance between steel and castings production, CPA Commissioner John C. Houston, Jr., last week told a group of steel industry executives that steel demands, in a wide range of products, will decrease unless the output of castings, also needed in these items, is stepped up by making foundry grades of pig iron available.

The meeting was called by CPA to report the effect of the low production rate of castings of suitable quality and to find a solution for the problem. CPA said, however, that no formal government action is contemplated and added that no suggestions promising a quick increase in the supply of castings were put forth. Steel industry officials making merchant pig iron, stated that they are now producing at full capacity.

Improving and increasing the supply of coke, stepping up the flow of scrap to consumers, and bringing more closed blast furnaces into production were among the suggestions for solving the problem of more raw materials for castings. There was general agreement that none of these proposals, other than increasing scrap supplies, would yield quick results.

Several steel company representatives said that their current output of pig iron was being reduced approximately 8 pct because of low quality coke. They added that improvement of their coke supply through installation of coal washing apparatus would take months.

Emphasizing the merry-go-round character of current shortages, it is reported that the industries backing CPA in this investigation are those that have been loudly proclaiming their inability to obtain a fair share of finished steel, notably auto producers.

A representative of one auto company at the meeting said that in order to keep up production his company had been forced to divert some of the iron it had produced for steel making to aid foundries which supply the firm's castings.

Coming Events

- Mar. 22-27 Western Metal Conference and Exposition, American Society for Metals, Oakland, Calif.
- Mar 24-25 American Machine Tool Distributors' Assn., spring meeting, Chicago.
- Mar. 31-Apr. 2. Midwest Power Conference, Chicago.
- Apr. 7 Packaging Machinery Manufacturers Institute, semiannual meeting, Philadelphia.
- Apr. 7-10 National Assn. of Corrosion Engineers, convention, Chicago.
- Apr. 8-11 American Management Assn., packaging exposition, Philadelphia.
- Apr. 14-16 National Machine Tool Builders' Assn., spring meeting, Atlantic City, N. J.
- Apr. 14-17 Electrochemical Society, Inc., Columbus, Ohio.
- Apr. 14-17 Southern Machinery & Metals Exposition, Atlanta.
- Apr. 21-23 American Institute of Mining & Metallurgical Engineers, openhearth, coke oven, blast furnace and raw material committees, annual conference, Cincinnati.
- Apr. 28-29 American Zinc Institute, annual meeting, St. Louis.
- Apr. 28-May 1 American Foundrymen's Assn., convention, Detroit.
- Apr. 29-May 1 Industrial Packaging and Materials Handling Exposition, Industrial Packaging Engineers Assn. of America, Chicago.
- May 5-6 National Welding Supply Assn., convention, Philadelphia.
- May 6-10 Society of the Plastics Industry, Inc., exposition, Chicago.
- May 15-17 Society for Experimental Stress Analysis, annual meeting, Chicago.
- May 26-27 American Iron & Steel Engineers, annual spring conference, Philadelphia.
- May 27 Metal Powder Assn., spring meeting, New York.
- June 2-4 American Gear Manufacturers, Hot Springs, Va.
- June 9-11 American Coke & Chemical Institute, annual meeting, French Lick, Ind.
- June 16-20 American Society for Testing Materials, annual meeting, Atlantic City, N. J.
- June 17-19 Machinery Dealers National Assn., convention, Cincinnati.
- June 23-27 American Electroplaters Society, industrial finishing show, Detroit.
- July 14-18 American Society of Civil Engineers, Duluth, Minn.

AMERICAN IRON AND STEEL INSTITUTE

Production of Open Hearth, Bessemer and Electric Steel Ingots and Steel for Castings

YEAR 1947

Based on Reports by Companies which in 1946 made 97.6% of the Open Hearth, 100% of the Bessemer and 85.8% of the Electric Ingot and Steel for Castings Production

Period	Estimated Production—All Companies								Calculated weekly production, all companies (Net tons)	Number of weeks in month
	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL			
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
January.....	6,544,841	95.1	384,096	87.7	283,740	65.8	7,212,677	93.0	1,628,144	4.43
February.....	5,836,517	93.9	314,193	79.5	279,964	71.9	6,430,674	91.9	1,607,669	4.00
March.....										4.43
1st Quarter.....										12.86
April.....										4.29
May.....										4.43
June.....										4.29
2nd Quarter.....										13.01
1st 6 Months.....										25.87
July.....										4.42
August.....										4.43
September.....										4.28
3rd Quarter.....										13.13
9 months.....										39.00
October.....										4.43
November.....										4.29
December.....										4.42
4th Quarter.....										13.14
2nd 6 months.....										26.27
Total.....										52.14

Note—The percentages of capacity operated are calculated on weekly capacities of 1,553,721 net tons open hearth, 98,849 net tons Bessemer and 97,358 net tons electric ingots and steel for castings, total 1,749,928 net tons; based on annual capacities as of January 1, 1947 as follows: Open hearth 81,010,990 net tons, Bessemer 5,154,000 net tons, Electric 5,076,240 net tons, total 91,241,230 net tons.

Revised Preliminary figures, subject to revision.

YEAR 1946

Based on Reports by Companies which in 1946 made 97.6% of the Open Hearth, 100% of the Bessemer and 85.8% of the Electric Ingot and Steel for Castings Production

Period	Estimated Production—All Companies								*Calculated weekly production, all companies (Net tons)	Number of weeks in month
	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL			
	*Net tons	*Percent of capacity	*Net tons	*Percent of capacity	*Net tons	*Percent of capacity	*Net tons	*Percent of capacity		
January.....	3,528,090	51.1	207,512	47.4	136,452	29.2	3,872,054	49.6	874,053	4.43
February.....	1,300,944	20.9	25,905	6.6	65,668	15.6	1,392,517	19.8	348,129	4.00
March.....	5,946,698	86.2	363,949	83.1	196,400	42.0	6,507,047	83.3	1,468,859	4.43
1st Quarter.....	10,775,732	53.8	597,366	47.0	398,520	29.4	11,771,618	51.9	915,367	12.86
April.....	5,333,139	79.8	286,088	67.5	241,031	53.3	5,860,258	77.5	1,366,028	4.29
May.....	3,699,979	53.6	153,409	35.0	219,064	46.9	4,072,452	52.2	919,289	4.43
June.....	5,145,594	77.0	251,253	59.2	227,979	50.4	5,624,826	74.4	1,311,148	4.29
2nd Quarter.....	14,178,712	69.9	690,750	53.7	688,074	50.1	15,557,536	67.9	1,195,814	13.01
1st 6 months.....	24,954,444	61.9	1,288,116	50.4	1,086,594	39.8	27,329,154	59.9	1,056,403	25.87
July.....	6,023,799	87.5	365,332	83.6	228,083	48.9	6,617,214	84.9	1,497,107	4.42
August.....	6,287,617	91.1	373,837	85.4	261,755	56.0	6,923,209	88.7	1,562,801	4.43
September.....	5,947,688	89.2	371,465	87.8	235,054	52.1	6,554,207	86.9	1,531,357	4.28
3rd Quarter.....	18,259,104	89.3	1,110,634	85.6	724,892	52.3	20,094,630	86.8	1,530,436	13.13
9 months.....	43,213,548	71.1	2,398,750	62.2	1,811,486	44.0	47,423,784	69.0	1,215,994	39.00
October.....	6,308,845	91.4	387,933	88.6	253,562	54.3	6,950,340	89.0	1,568,926	4.43
November.....	5,869,767	87.8	318,350	75.1	268,655	59.4	6,456,772	85.4	1,505,075	4.29
December.....	5,283,651	76.7	222,704	51.0	253,353	54.3	5,759,708	73.9	1,303,101	4.42
4th Quarter.....	17,462,263	85.3	928,987	71.5	775,570	56.0	19,166,820	82.8	1,458,662	13.14
2nd 6 months.....	35,721,367	87.3	2,039,621	78.5	1,500,462	54.1	39,261,450	84.8	1,494,536	26.27
Total.....	60,675,811	74.7	3,327,737	64.6	2,587,056	47.0	66,590,604	72.5	1,277,150	52.14

Note—The percentages of capacity operated are calculated on weekly capacities of 1,558,041 net tons open hearth, 98,849 net tons Bessemer and 105,491 net tons electric ingots and steel for castings, total 1,762,381 net tons; based on annual capacities as of January 1, 1946 as follows: Open hearth 81,236,250 net tons, Bessemer 5,154,000 net tons, Electric 5,500,290 net tons, total 91,890,540 net tons.

*Revised July through December, 1946.

Survey Shows Metalworking Plants Are Biggest Borrowers

Chicago

... Everyone in business is thoroughly familiar with the sequence of events since VJ-Day that have caused the nation's inventory values to reach record heights. Commensurate to this trend has been a wholesale sharp increase in commercial and industrial loans made by banks to all businesses in general. Small organizations of total assets less than \$50,000, comprise 65.5 pct of the applicants for the recent loans.

The metal and metal product plants have been found to be the largest borrowers of any single industry according to a survey conducted by the Seventh Federal Reserve System in Chicago. For the first time detailed information regarding loan distribution by number, dollar value and type of business is available as a result of the special survey.

The run for commercial loans by all industry has been prevalent since June, 1946, and has been closely followed by the Federal Reserve Bank in Chicago. (THE IRON AGE, Sept. 5, 1946, p. 110.) The trend has shown continued upward tendency with present de-

Special Federal Reserve Study Yields Detailed Data On Loan Distribution

By D. I. BROWN
Chicago Regional Editor

mand indicating a possibility of leveling off. Because of the lack of specific information regarding the reasons for loans, and the type of business involved, the Federal Reserve study was made to permit better scrutiny of the situation and a complete distribution breakdown by industry.

The study embraced only the Seventh Reserve District, comprising the state of Iowa and the major industrial sections of Illinois, Michigan, Wisconsin and Indiana. As the states involved received 36.9 pct of the rolled metal products in the country in 1946 (THE IRON AGE, Jan. 2, 1947, p. 75), the results may, therefore, be typical of the entire metalworking industry. Although the Seventh District does not include the total area of each state excepting Iowa,

it nevertheless represents very close to the total industrial area of the states. It has been estimated by Walter E. Hoadley, Jr., industrial economist of the research and statistic division, who was in charge of the survey, that 95 pct of the industrial sections of each state fall within the Seventh District, with the exception of Illinois where the figure is close to 80 pct.

Fig. 1 portrays the extent of the recent rise in commercial and industrial loans made by Federal Reserve member banks in the entire country with further breakdown for the Seventh District, Chicago, and Detroit areas.

With the exception of Detroit, the loans in the other areas follow the national trend. As some companies in the Detroit area usually conduct financial arrangements in the city of New York, the apparent lower value of Detroit loan demand shown by the curve would have to be adjusted, by including New York loans to this area, to present the best ultimate comparison.

At the end of the war most financial observers believed that the large liquid assets of all American businesses would preclude an immediate period of substantial financial help from the banks. The reverse actually happened. The financial position of business at VJ-Day was extremely sound and the fact that large numbers of loans have been made does not necessarily indicate that the present position of business is unsound. Four main reasons are cited by banking executives as the reasons for the unexpected demand for financial help.

- (1) Large material cost increases.
- (2) Government funds no longer available.
- (3) All operating expenses up—labor, transportation, marketing, etc.
- (4) Production delays because of strikes, material shortages, etc.

The above factors have hit the metalworking industry harder than any other type of business. Table I shows that 19½ pct of all loans were made to help such or-

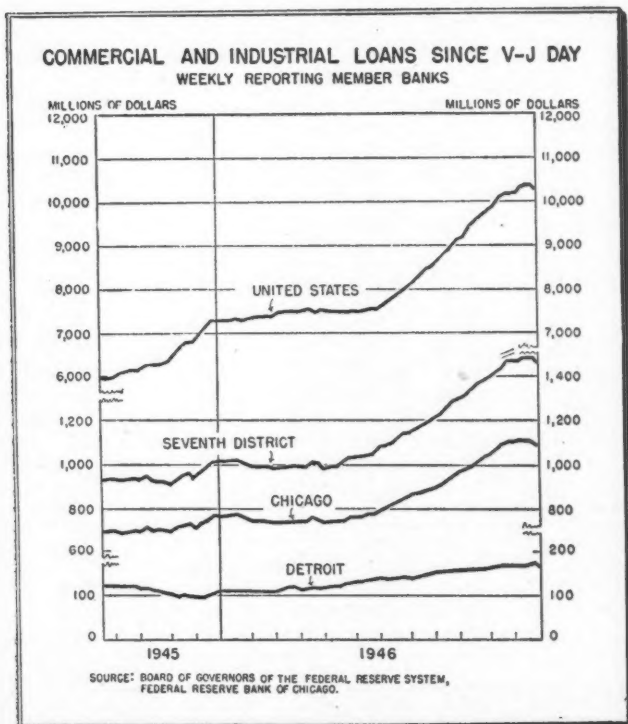


FIG. 1—The rising trend of commercial loans since the end of the war with Japan shows a uniform picture with the exception of Detroit. The motor city's variation from the national average is explained by the fact that some of its financing is carried out through New York Banks. Many observers predict a rising trend during the first half of 1947. The year-end dip can be ascribed to the holiday let-down.

ESTIMATED NUMBER AND VOLUME OF COMMERCIAL AND INDUSTRIAL LOANS OUTSTANDING
SEVENTH FEDERAL RESERVE DISTRICT MEMBER BANKS

NOVEMBER 20, 1946

CLASSIFICATION	Number of Loans		Volume of Loans		CLASSIFICATION	Number of Loans		Volume of Loans	
	Thou- sands	Per Cent of Total ¹	Millions of Dollars	Per Cent of Total		Thou- sands	Per Cent of Total	Millions of Dollars	Per Cent of Total
By Deposit Size of Lending Bank					D. By Age of Borrower's Business				
Under \$2,000,000	4.9	6.4	9.8	0.5	New (Founded after 1942)	21.9	28.6	130.6	7.1
\$2,000,000-\$10,000,000	25.6	33.4	89.2	4.8	Old (Founded in 1942 or earlier)	54.7	71.4	1,709.5	92.9
\$10,000,000-\$100,000,000	36.0	47.0	361.7	19.7	Total	76.6	100.0	1,840.0	100.0
\$100,000,000-\$500,000,000	5.7	7.4	340.6	18.5					
Over \$500,000,000	4.5	5.9	1,038.7	56.5	E. By Borrower's Form of Business Organization				
Total	76.6	100.0	1,840.0	100.0	Corporate	18.7	24.4	1,481.9	80.5
By Asset Size of Borrower					Non-Corporate	57.9	75.6	358.1	19.5
Under \$50,000	50.2	65.5	131.9	7.2	Total	76.6	100.0	1,840.0	100.0
\$50,000-\$250,000	17.6	23.0	244.4	13.3					
\$250,000-\$750,000	4.5	5.9	197.2	10.7	F. By Type of Principal Security				
\$750,000-\$5,000,000	2.4	3.1	390.3	21.2	Unsecured	31.3	40.9	1,088.5	59.2
Over \$5,000,000	1.4	1.8	872.1	47.4	Secured				
Unclassified	0.5	0.7	4.1	0.2	Endorsed	2.9	3.8	40.9	2.2
Total	76.6	100.0	1,840.0	100.0	Co-Maker	1.4	1.8	3.4	0.2
By Business of Borrower					Trust receipts	0.4	0.5	5.9	0.3
Manufacturing and Mining					Chattel mortgages	14.1	18.4	72.2	3.9
Food, liquor, and tobacco	2.0	2.6	209.0	11.4	Warehouse receipts and other inventory	2.1	2.7	97.2	5.2
Textiles, apparel, and leather	0.7	0.9	32.1	1.7	Plant or other real estate	11.4	14.9	128.4	7.0
Metals and metal products, including transportation equipment and parts	5.7	7.4	358.3	19.5	U. S. Government securities	1.5	2.0	47.7	2.6
Petroleum, coal, chemicals, and rubber	0.7	0.9	196.2	10.7	Other securities	2.8	3.7	78.4	4.3
All other	4.5	5.9	119.5	6.4	Assignments of deeds, mortgages, and claims	1.8	2.3	124.2	6.8
Total manufacturing and mining	13.6	17.8	915.0	49.7	Accounts receivable	1.6	2.1	26.1	1.4
Wholesale Trade					Oil runs	0.1	0.1	57.3	3.1
Food, liquor, tobacco, and drugs	3.2	4.2	137.4	7.5	Life insurance	2.9	3.8	18.7	1.0
Apparel, dry goods, shoes, etc.	0.5	0.7	17.7	1.0	Time deposits	0.4	0.5	0.9	0.1
Home furnishings, appliances, hardware, lumber, and metal products	2.1	2.7	35.8	1.9	V, V-T, or T loans	*	0.1	5.4	0.3
Automobiles and parts, and petroleum	0.7	0.9	17.8	1.0	R.F.C. participation or guarantee	0.2	0.3	12.0	0.6
All other	1.9	2.5	41.4	2.2	Federal Reserve Bank participation or guarantee	*	*	0.9	0.1
Total wholesale trade	8.4	11.0	250.1	13.6	Other secured (Including G.I. loans)	1.5	2.0	31.5	1.7
Retail Trade					No security indicated	0.1	0.1	0.7	*
Food, liquor, tobacco, restaurants, and drug stores	9.6	12.5	35.5	1.9	Total	76.6	100.0	1,840.0	100.0
Apparel, dry goods, shoes, mail order houses, general and department stores	3.6	4.7	53.5	2.9					
Home furnishings, appliances, hardware, farm implements, lumber, and metal products	7.1	9.3	37.0	2.0	G. By Length of Loan				
Automobile dealers, auto accessory stores, and filling stations	5.1	6.7	22.2	1.2	One year or less	57.9	75.6	1,099.7	59.8
All other	5.1	6.7	25.0	1.4	Over one year	18.7	25.4	740.3	40.2
Total retail trade	30.6	40.0	173.2	9.4	Total	76.6	100.0	1,840.0	100.0
Other Classified									
Transportation, communication, and other public utilities	4.2	5.5	147.2	8.0	H. By Location of Lending Bank				
Hotels, amusements, professional, repair, and other services	8.7	11.4	64.2	3.5	Illinois	27.3	35.6	1,253.3	68.1
Building and road construction contractors and sub-contractors	5.1	6.7	46.8	2.5	Indiana	14.7	19.2	129.7	7.0
Sales finance companies	1.1	1.4	126.5	6.9	Iowa	5.5	7.2	38.9	2.1
All other	4.8	6.3	116.2	6.3	Michigan	18.9	24.7	278.8	15.2
Total other classified	23.9	31.2	500.8	27.2	Wisconsin	10.2	13.3	139.3	7.6
Unclassified	0.1	0.1	0.9	0.1	Total	76.6	100.0	1,840.0	100.0
Total	76.6	100.0	1,840.0	100.0					

¹Less than .05.

Note: These estimates of loans in 992 Seventh District member banks are based on data reported by a sample of 202 banking offices. Figures have been rounded and need not add to totals.

TABLE I

ganizations and 49.7 pct were specifically to manufacturing and mining companies. Of the important industrial states in the Seventh District, the percentage in dollars of loans under the manufacturing and mining group which were made exclusively to metal and metal product firms in each of these states, were reported to THE IRON AGE as follows:

State	Pct	Dollar Value (millions)
Illinois	52.7	\$225.0
Michigan	47.8	85.9
Wisconsin	45.1	26.5
Indiana	35.9	17.5

From Table I it is apparent that smaller businesses are the ones which most frequently need help. This was also found to be true in the metalworking field but the precise percentages of loans granted to smaller companies of this particular type are not available.

It is claimed by leading financiers in this area that despite the acute need for more ready cash, with which to conduct business, the financial structure of industry is still very sound. The best proof of this contention is found in Table I under type of security offered for loans received. The general position of the companies which were granted loans was found to be so strong that 59.2 pct of all the companies requiring aid did not have to advance any specific security.

Another trend worthy of note is found in Table I under the form of business organization. The change in the excess profit tax situation effected after the end of the war, seems to have caused more companies to change to the corporate category.

Concerning the possibility of inflationary potentialities because of upward movement of wholesale and retail prices, large inventory holdings, and the rest of the important factors which have caused the increase in commercial loans, Mr. Hoadley commented that "To those who see further substantial price increases as a definite possibility, perhaps culminating in a collapse comparable with 1920 to 1921, any inflationary element in loan expansion is an unmixed evil.

"There are, however, increasing numbers of persons who consider the wartime and postwar inflation as largely past history. They view

the economic problem of 1947 as one resisting deflationary pressure, minimizing any downturn and achieving stability at the present price level or possibly a somewhat higher one. To them an inflation potential offers in itself no serious cause for alarm."

Mr. Hoadley further elaborated, "These economic problems may appear remote to an individual banker considering an individual loan. The new borrower or the old customer desiring additional accommodations, is in a sound and liquid position as judged by normal credit standards. Bank loans to individual firms make possible needed expansion in output of goods insofar as manpower, materials and equipment are available. Under conditions where these resources are fully utilized, however, the extent to which production as a whole can be accelerated or expanded by financial accommodation is reduced. In the latter instance, recipients of additional credit may be able to expand facilities or production, but probably only at the expense of others, with a small addition if any, to total output."

Mr. Hoadley summed up by saying "While the general business situation at present is characterized by record peacetime use of manpower and material resources,

divergent trends among industries and firms are becoming increasingly important. In many lines, demand, production and prices continue strong, and seem likely to remain so for many months; at the other extreme, numerous firms have already experienced sharp sales reductions that have uncertain prospects. Continuing close study of trends in particular business lines obviously will be prerequisite to effective commercial bank lending policies in coming months."

Overall it appears to observers here that small metalworking plants will continue to need financial assistance until the material shortage is eased. Whether the help received to date will carry them that far is one of the unknowns in the equation. Obviously, the banks will continue to become more critical of their borrowers' position, but from past practice it is judged loans will continue to be made to anyone in good condition although unsecured loans will decrease.

Any further price increases if of broad scope can't help but complicate the situation, but observers point out that increased production, if accomplished in the next 6 months, will greatly diminish inflationary or business failure threats.

Outlines Reasons For Voting for Portal Bill Which Limits Back Pay

Washington

••• Rep. John D. Lodge, R., Conn., succinctly summarized his reasons for voting for the portal-to-portal bill (HR 2157), which limited back pay to 1 year. He favored a 3-year extension. He thought this limitation was faulty, but felt that the good points of the bill far outweighed what he considered its shortcomings.

He said he favored the legislation for reasons which are highlighted as follows:

(1) To protect the millions of working people of this country against the unemployment and uncertain conditions of employment which would result if these portal-to-portal suits were allowed.

(2) To protect the millions of people of this country against the increased taxes which might very well result if these suits were allowed.

(3) To protect the millions of Americans who own the businesses of this country against the failure of these businesses, due to the allowance of these claims.

(4) To protect the U. S. Government against the financial burdens . . . mentioned and also against uncertainty with respect to future contractual obligations of the government.

(5) To protect the American people, customers from whom in the end all income is derived, against a complete dislocation of industry which ultimately would result in benefits to no one.

(6) To protect our chances for world peace by preventing disturbances in our economy.

The London **ECONOMIST**

The Third Arm

ACCORDING to the little descriptive booklet that awaits visitors to the huge white marble building where, since 1935, the justices of the Supreme Court of the United States have had their official being, "Our government is divided into three separate and equal branches, so constituted that each functions freely within the limits of its constitutional authority, though open to check by one or both of the others if attempt be made to exercise powers not granted by the Constitution."

For almost a decade, the third arm of government has rarely been in the news. The restlessness of men like Byrnes, in the judicial interval between his legislative and his executive phase, has been matched by more than one of his former colleagues.

With the exception of Rutledge, who came to the Supreme Court from the post of Dean of a Law School, followed by that of Judge of the Court of Appeals, and the questionable exception of Frankfurter, whose law courses were, after all, a recognized nursery for New Deal administrators, the entire Court is now composed of men with recent service in major executive or legislative posts.

Perhaps that is why the Court is not too composed—the echo of each other's footsteps in the unaccustomed quiet might easily get on the nerves of men, not past their prime, suddenly removed from the bustle and strain and spotlight of the—till now—more vivid arms of government.

But an inverted parallel with the years 1933-37 is now bringing the Court into the center of attention. The decision in the case of *Anderson vs. Mount Clemens Pottery Co.*, which touched off the

portal-to-portal pay suits, now amounting to several billions,* and the decision on John L. Lewis, are matters which concern far wider groups of people than the immediate litigants. And beyond these specific cases, is the Court's position as a political institution.

In 1933 and 1934, despairing Republicans could offer each other the partial comfort of saying, "Anyhow, we still have the Court." And the decisions of 1934 and 1935 indicated that they did.

Today, Democrats are trying to look from the White House over the dome of the Capitol to the peaked roof beyond. In their eyes, now is the time for the good men of the Court—seven Roosevelt and two Truman appointees, all except Mr. Burton of indubitably Democratic origin—to come to the aid of the Party.

BUT in today's American context the matter is not so simple. When the New Deal's record legislative output reached a Supreme Court composed of Chief Justice Hughes and Justices Van Devanter, McReynolds, Brandeis, Sutherland, Butler, Stone, Roberts and Cardozo, a group whose advancing years raised the Court's average age to 70 in 1935 for the first time in American history, the question repeatedly presented was whether Acts of Congress were constitutional. One by one, the Court knocked out the major New Deal measures. The negative unanimity it achieved over Mr. Schechter's sick chicken—whose death was generalized into the death of the National Recovery Act—was not always maintained, but in less than 2 years it effectively upset eight major pieces of legislation. The Roosevelt counterattack followed.

But the last Federal law upset by the Court was in May 1936; in a manner reminiscent of the House of Lords at the time of Britain's liberal revolution, the Court defeated a proposed change in structure by itself behaving in the

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manner which the structural change would have induced. With the substitution of only one Justice—Black for Van Devanter—in 1937 it upheld the National Labor Relations Act, the Social Security Act, the Regulation of Public Utility Holding Companies, the Home Owners Loan Corp. Act, and slightly changed versions of some of the Acts—farm mortgage moratorium, railway labor—that it had thrown out before.

Perhaps the most telling evidence of the majority's altered view is the fact that in the 1937-38 term of Court, Justice Brandeis dissented only twice. So even before Roosevelt got the Court, through continued tenure on his part and death and retirement on the part of the Justices, the Republicans had lost it. In reversed circumstances, what are the Democrats' prospects?

Now, most of the questions likely to come before the Court are not likely to be questions of constitutionality. The Republicans are not coming in with a sheaf of innovations ready to offer as law. Their major legislative proposals, to the state legislatures as well as to Congress, largely concern the single subject of labor.

Fewer Court rulings on the constitutionality of statutes can therefore be expected, and the great majority of cases reaching the Courts will be brought under statutes that are themselves not in doubt or under the familiar guarantees of the Constitution itself.

In these circumstances, the major issue before the Supreme
(CONTINUED ON PAGE 150)

* The Supreme Court first ruled that wages based on hours of work should cover all time spent by workers on company premises, from entering the "portal" to leaving it. This decision brought a wave of union claims (recently totaling \$5.8 billion) and the Court ordered a review of the case by a Federal District Court which dismissed the claims. Congress is now seeking a ban on all "portal" wage claims.

Industrial Briefs . . .

• **SUPERCHARGER RESEARCH** — With the completion of a highly modern research laboratory and the addition of new machine tool equipment, the Pesco Products Div. of Borg-Warner Corp., Cleveland, has made an addition to facilitate the production of superchargers. The engineering staff of the company is concentrating on developing superchargers for heavy duty gasoline engines for trucks, busses and other industrial uses.

In addition there is extensive research on superchargers for small, high speed diesel engines and for the engines of the light pleasure aircraft. To date tests have shown that Borg-Warner superchargers can step up engine power as much as 40 pct without appreciably increasing engine size or weight.

• **NEW COMPANY** — With an authorized capital stock of \$150,000, a corporation to deal in basic slag products for agricultural purposes, has been organized at Birmingham. Basic Products Co., Inc., is the name of the new company. Incorporators are R. D. Beatty, Olga M. Beatty, S. W. Smyer and Sidney W. Smyer.

• **FARM PRODUCTS**—Kilby Steel Co., Anniston, Ala., has begun the manufacture of tractor attachments such as cultivators, disc plows and hay rakes. Company officials said the products would be shipped to the J. I. Case Co., Racine, Wis., and distributed by Case.

• **COR-TEN LICENSE**—Carnegie-Illinois Steel Corp., U. S. Steel subsidiary, announced that Inland Steel Co., has been licensed to manufacture "Cor-Ten," a corrosion-resistant, high-strength, low-alloy steel developed by Carnegie-Illinois. Inland Steel Co., in turn, has licensed Carnegie-Illinois to manufacture "Hi-Steel," likewise a corrosion-resistant, high-strength, low-alloy steel developed by Inland.

• **GAS TURBINE** — Ground has been broken for a multi-million dollar gas turbine laboratory by the Pratt & Whitney aircraft division of United Aircraft Corp. It is to contain equipment for simulating many conditions of altitude, temperature and speed. Power ranging from 5000 to 18,000 hp in a single test unit, far greater than any ever applied in any of the company's piston engine test houses, will be possible. Power for the compressor test laboratory will be furnished by surplus propulsion equipment obtained from the junked lend-lease destroyer-escort Bligh.

• **STEEL PLANT SOLD**—A surplus steel castings plant in Portland, Ore., sponsored by the Maritime Commission to expedite wartime ship production, has been sold to H. F. Dick, of Portland, for \$105,000, WAA has announced. Mr. Dick and Lewis R. Banks, Portland, are the owners of the Columbia Steel Castings Co. plant adjoining the newly-acquired property.

• **GAS PIPELINE** — Plans have been made for a 1000 mile gas pipeline from the Texas Gulf Coast region to West Virginia. It will be a 26-in. line and will cost about \$55 million. Construction will begin on the new line, to have a daily capacity of 600 million cu ft, as soon as the Federal Power Commission grants authority.

• **MERGER** — Bright Light Reflector Co., Inc. of Bridgeport, Conn. and International Appliance Corp. of New York have been merged and consolidated to form Bridgeport Pressed Steel Corp., with its plants in Bridgeport, Conn. The offices of both the Bridgeport Pressed Steel and the Bright Light Reflector will be located in Bridgeport, and the offices of International Appliance Corp. remain in New York.

Harvester's Reduction In Prices Will Be Made Effective Before April

Chicago

• • • The price reduction, recently announced by International Harvester Co., will become effective before Apr. 1 and will apply to a selective list of products in the company's line of tractors, farm machines, motor trucks and industrial power equipment. It is estimated that the cuts will save the users of its products approximately \$20 million a year and John L. McCaffrey, Harvester president, said that such action was taken, because "We believe there is nothing more important to this country than to lower the prices of the goods that people buy."

The spokesman for Harvester continued, "We have undertaken this program despite the fact that our prices have not risen so much or so rapidly as the prices of most other industrial products. Government reports show that the prices of all manufactured products in the United States have risen 62½ pct since 1941. In that same period, prices of our motor trucks rose 35 pct, our industrial power products 34 pct, and our tractor and farm machines only 25 pct."

Mr. McCaffrey said that the American people had insisted that the government withdraw from its attempt to control prices in peacetime. With the government withdrawal the responsibility has been placed where it belongs, in the hands of business and industry. It was pointed out that not all business can reduce prices now and not all companies can reduce by the same amount. "Our company has felt a duty to act as quickly as possible," Mr. McCaffrey said. "In our case, the business outlook now makes it possible to move toward the goal of lower prices." The company spokesman stated that their ability to maintain the lower level of prices will depend on what happens to prices and flow of materials that the company purchases from others.

German Machine Tools Go on Exhibit Mar. 31 At Frankford Arsenal

Washington

• • • A month-long exhibit and demonstration of outstanding German machine tools will be held at Frankford Arsenal, Philadelphia, Mar. 31 through May 2 for representatives of American industry, particularly the machine tool industry, according to John C. Green, director, Office of Technical Services, Dept. of Commerce.

The tools will be on exhibit Monday through Friday of each week from 9 a.m. to 4 p.m. for the duration of the exhibit. Most of the machines will be in operating condition and will be demonstrated by Frankford Arsenal technical experts.

The exhibit is sponsored jointly by OTS, the Office of the Chief of Ordnance of the War Dept., the National Machine Tool Builders Assn., and the Army Ordnance Assn.

The items to be displayed include various types of grinding, rolling, and milling machines, measuring and testing apparatus, and plastics processing equipment. The tools range in weight from a few pounds to tons.

The equipment was brought to this country through the efforts of American investigators who have made a study of the German machine tool industry since VE-day. Some of the tools are believed to incorporate features which may suggest changes in American practices, Mr. Green said. However, none of them have yet been tested under American conditions. This exhibit will afford American industry an opportunity to examine the tools critically before a thorough testing program is inaugurated.

Of outstanding interest in the exhibit is a precision grinding machine with an optical system which enables the operator to compare his work with the engineer's drawing as the work proceeds. The machine is used in Germany for making templates, cylindrical forms, and complicated shapes. Its optical arrangement is believed to be an innovation in machine tool practice.

Another item of special interest

is an ultramicrometer apparatus for measuring radial tolerances to a precision of 0.4 to 10.0 microns. The device, labeled "Kapatest" by the Germans, is used to compute clearances between two precision-fitted parts such as the cylinder and piston of a fuel injection pump.

A cylindrical grinder, a thread milling machine, jig borer, hydraulic engine lathe, plastics extrusion machine, a machine for

making radiator water channels with integral finning, and a profile grinding machine are other items to be displayed.

Prospective visitors are requested to notify Carl O. Hoffman, chief, Materiel Unit, Technical Industrial Intelligence Div., Office of Technical Services, Dept. of Commerce, Washington 25, D. C. (Telephone, DIstrict 2200, Extension 2531), of the date on which they plan to attend.

Construction Steel . . .

• • • Fabricated steel awards this week included the following:

- 1100 Tons, Louise, Ariz., U. S. Bureau of Reclamation Spec. 1601 Davis Dam, to Western Pipe & Steel Co., San Francisco.
- 800 Tons, Fort Wayne, Ind., Building for U. S. Rubber Co. to Ingalls Iron Works Co., Birmingham.
- 350 Tons, Chicago, building for Goodman Mfg. Co., to Mississippi Valley Structural Steel Co., Decatur, Ill.
- 295 Tons, Odair, Wash., main unit trans-racks, Grand Coulee Dam, Bureau of Reclamation, Denver, Spec. 1614, to Joshua Hendy Iron Works, Sunyvale, Calif.
- 135 Tons, Denver, building for Firestone Tire & Rubber Co., Midwest Steel & Iron Works Co., Denver.
- 100 Tons, York County, Pa., Pennsylvania Dept. of Highways, Bridge, Section 66049, to Bethlehem Steel Co., Bethlehem, Pa.

• • • Fabricated steel inquiries this week included the following:

- 4350 Tons, Port Arthur, Tex., ten storage tanks.
- 4000 Tons, Philadelphia, Yale & Towne Mfg. Co. through Turner Construction Co., Philadelphia, bids in.
- 1750 Tons, Port Natches, Tex., oil storage tanks.
- 1075 Tons, Dolton, Ill., Pennsylvania grade separation.
- 1000 Tons, Omaha, Neb., Veterans' Hospital.
- 750 Tons, Green Bay Wis., addition to Bay-side Station.
- 625 Tons, Thornton, Ill., Calumet Parkway grade separation.
- 600 Tons, St. Paul, Minn., Hippodrome building.
- 500 Tons, Modesto, Calif., bridge across Stanislaus River, California Div. of Highways, Sacramento, bids to Apr. 9.
- 500 Tons, Marcus Hook, Pa., Congoleum Nairn Co., through Turner Construction Co., Philadelphia, bids in.
- 350 Tons, Chicago, manufacturing building.
- 130 Tons, Long Beach, Calif., wharves and bulkheads, berths 52, 53, 54, Port Manager, Long Beach, bids to Apr. 9.
- 107 Tons, Lackawana County, Pa., Pennsylvania Dept. of Highways, bridge, Route 168, Pine Brook Iron Works, low bidder.
- 105 Tons, Lodi, Calif., bridge across Mokelumne River, California Div. of Highways, Sacramento, bids to Apr. 9.

• • • Reinforcing bar awards this week included the following:

- 165 Tons, Butte City, Calif., bridge across Rascor Slough and Sacramento River, through Johnson Western Co., Alameda, to Kyle Co., Stockton, Calif.

• • • Reinforcing bar inquiries this week included the following:

- 750 Tons, Philadelphia, Yale & Towne Mfg.

Co., through Turner Construction Co., Philadelphia.

- 220 Tons, Long Beach, Calif., wharves and bulkheads, berths 52, 53, 54, Port Manager, Long Beach, bids to Apr. 9.
- 140 Tons, Modesto, Calif., bridge across Stanislaus River, California Div. of Highways, Sacramento, bids to Apr. 9.
- 130 Tons, Lodi, Calif., bridge across Mokelumne River, California Div. of Highways, Sacramento, bids to Apr. 9.
- 110 Tons, Klamath Co., Ore., three bridges over Sprague River on Sprague River highway, State Highway Commission, Portland, bids to Mar. 25.
- 100 Tons, Hardwick, Calif., bridge across Kings River, California Div. of Highways, Sacramento, bids to Apr. 9.

• • • Sheet piling awards this week included the following:

- 3600 Tons, Chicago, Northerly Island airport, City of Chicago, to Carnegie-Illinois Steel Corp., Pittsburgh.

• • • Sheet piling inquiries this week included the following:

- 23,955 Tons, Long Beach, Calif., straight web sheet piling, Port Manager, Long Beach, Spec. H. S. 232, bids to Mar. 26.
- 11,055 Tons, Long Beach, Calif., Z-38 section steel sheet piling, Port Manager, Long Beach, Spec. H. S. 232, bids to Mar. 26.

• • • Railroad car awards this week included the following:

- American Car & Foundry Co. has received an order from the Illinois Central R.R. Co. for 500 50-ton 33 twin hopper cars. Chesapeake & Ohio Ry. Co. has ordered ten passenger locomotives from the Lima Locomotive Works and Baldwin Locomotive Works.

Bailey Bridges on Sale

Cleveland

• • • WAA here has announced that it has completed the second of two sales of 2000 ft of the surplus bridges to the Hydro-Electric Commission of Ontario at a purchase price of \$93,661. Ideally suited for the task, they will span Ontario rivers at points where the commission is constructing new power plants.

MACHINE TOOLS

... News and Market Activities

Reports Market Irregular But Running Ahead of February

• • • Spotty business still prevails in many sectors of the machine tool industry, and the general market pattern at the moment seems to revolve around the surplus; tools which are in long supply in War Assets Administration warehouses are not being ordered from builders, but machines which are in short supply in the surplus are showing considerable firm order activity.

Coincident with their sales efforts on the home front, WAA people are pushing hard in the export market. According to WAA officials, machine tools are most in demand abroad, and recent sales from the Cleveland WAA inventory have been negotiated with Mexico, Canada and Siam.

A continued increase of sales to foreign governments and exporters is expected in the Cleveland region following the recent lifting of restrictions on the sale of surplus property for export. Shortages are disappearing in many commodities as production advances and to the extent that government surplus can be sold abroad, the domestic market is relieved and left open to absorb new production.

Under the new national WAA policy, no differentiation will be made as to whether the property is purchased for export or domestic use. Nonpriority exporters will receive the same treatment as other nonpriority buyers as to price, quantities apportioned and other conditions of sale. Both wholesalers and dealers will be notified of and may participate in all public offerings, even when the supply of the commodity in surplus is less than the estimated demand of the domestic market.

Around the industry many manufacturers indicate business in the first half of March ran ahead of the first half of February. It was not a pushover, however. Individual gains have been relatively small in some instances, but the fact they are gains is encouraging. Export business has been a

WAA Pushing Sales of Surplus In Export Market Where Demand Is Heavy

• • •

factor in swelling aggregate bookings so far this year.

Exports of grinding equipment have been especially gratifying not only because of volume but because of the number of countries interested in such tools. Although the government continues to advertise surplus equipment, less stress is placed on surplus tools. Some manufacturers' representatives and used tool houses feel this modification may be an indication that the cream of surplus tools has been taken off the market.

In Detroit it has been reported that plans for the Cleveland-Chevrolet plant have been set back an additional 2 months and suppliers of certain machine tools ordered for the Cleveland plant have been notified of the change in delivery date. Reasons given for the delay are reported to be the slow progress in construction work at the Cleveland plant. There are no indications, however, that the Cleveland project has been abandoned.

Considerable interest has been shown in the report that Borg-Warner will produce transmissions for the Ferguson Tractor in Detroit. It is understood that machines now installed in the Borg-Warner Wisconsin plant will be transferred to Detroit to carry on this work. Informed sources believe that production plans will be pushed so that the new facilities will be ready when the present Ferguson agreement with Ford expires in June.

Brig. Gen. Isaac Spaulding, new War Assets Administrator for the Detroit zone, has revealed that WAA is holding \$180 million worth of machine tools in its Detroit warehouses. This is almost 70 pct of the \$265 million Detroit inventory.

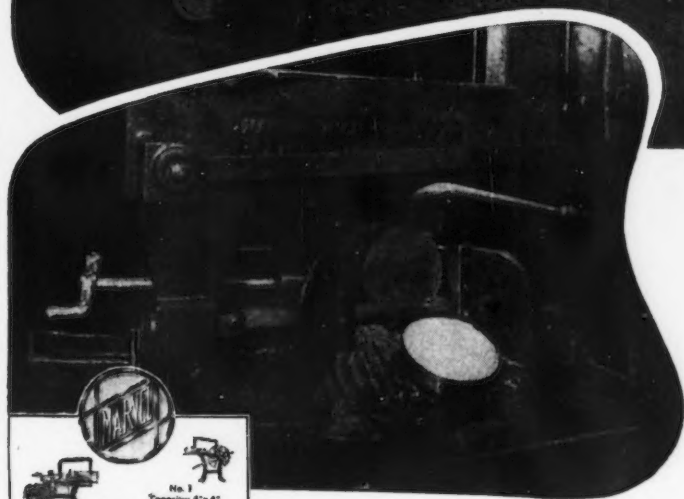
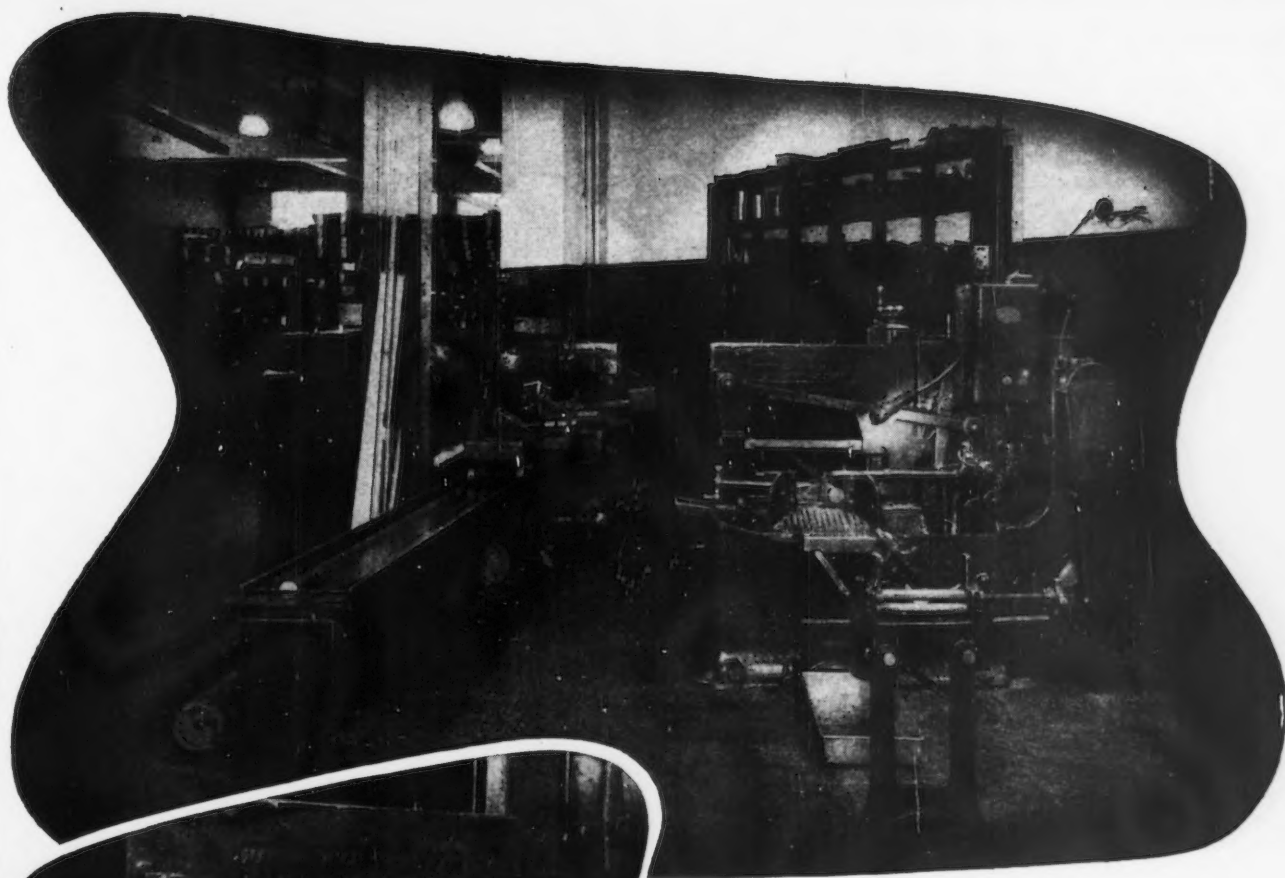
"We're going to get rid of every-

thing we have as soon as possible," General Spaulding asserted. "Personal goods that veterans might use will be sold in across-the-counter sales. But how can veterans use a shell loader or a huge press? We can't dump these on the market or it would put the entire machine tool industry out of business."

In Cincinnati the machine tool news this week is dominated by the purchasing of various plants operated during the war by Cincinnati concerns, and builders indicate that the only great activity is preparations for the coming Machine Tool Show to be held in the fall. The Cincinnati Shaper Co., wartime operator of a shears and press plant, this week purchased the plant from WAA for \$608,000. Specifically the land was sold for \$32,000. The buildings sold for \$422,000 and the machinery and equipment brought \$154,000. At the present time the working force at both plants of the company is 500, but the company plans to expand to about 658.

Costs, which are steadily increasing, are posing major problems for some segments of the industry. In most cases, the same number of hours are required to build a machine as prewar, but wages, overhead and materials have gone up considerably, which brings the question of price increases back into sharp focus. Generally speaking, most observers don't think the present is any time for further price increases, but present costs are a constant problem.

At the same time, some builders are bringing out new products. Recent additions to the market include a cut-off machine, a 12x12x12 crank pin milling machine, which roughs out a pin in 40 sec., and a plastic injection molding machine, pilot models of which are now on test. Such developments may play an increasingly important part in machine tool builders' plans if costs, prices and the machine tool market continue their present trends.



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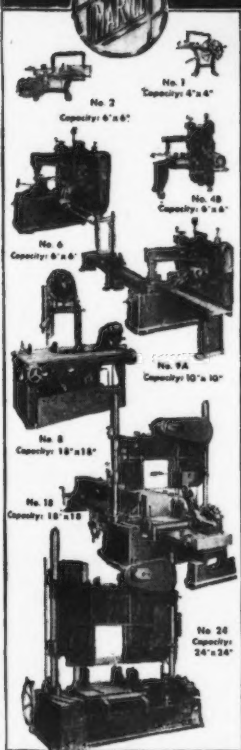
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MARVEL SAWS

NONFERROUS METALS

... News and Market Activities

Argentine Purchase Forecasts Tin Rise

New York

••• It is reported that a firm contract has been concluded between Argentina and Bolivia for the purchase of 8000 tons contained tin in Bolivian tin ores per year during the next five years at a price of 76¢ per lb of tin contained. Delivery is to start in 1947. It is understood that negotiations have been entered into tentatively for an additional 4000 tons per year.

Argentina has only one small tin smelter which has previously not handled more than 2000 tons per year. It is thought by the trade that the Argentine purchase must be for the purpose of trading with either the United States, Britain or the Netherlands. The firm tonnage of the contract represents one-fifth or more of total Bolivian production. Britain takes roughly half of Bolivian tin, which leaves very little tin ore for the continued operation of the Texas City smelter. It is significant that for a month or more our government officials have been negotiating with Bolivian tin producers for an extension of the present contract. At latest reports both sides were deadlocked on price.

In view of the Argentine contract the trade is of the opinion that our government must meet the price of 76¢ set by that contract in order to get Bolivian ores. It would be possible for the government to absorb the loss in tin represented by the operation of the Texas City smelter in order to maintain a stable price of tin. However, since we must also purchase refined tin from the Far East, it is certain that Britain's

price will be raised to meet this price once we conclude such an agreement with Argentina.

Government Copper Stocks Near End

Washington

••• Release to industry during March of approximately 30,000 tons of copper from the government's dwindling stockpile has been authorized by CPA. The March allocation leaves but about 25,000 tons in government stocks, including material in transit and yet to be refined.

CPA has estimated the 1947 monthly domestic production rate at from 80,000 to 85,000 tons against probable requirements of nearly 112,000 tons, leaving the anticipated shortage for the year at about 450,000 tons.

With the copper supply growing tighter, the Senate Finance Committee said this week that it would attempt to speed hearings on the Patterson bill (HR 2404) which, as passed by the House, would suspend the present import excise tax of 4¢ per lb on copper for a period of two years.

Modify Antimony Rules

Washington

••• Antimony users, in applying for allocations, will no longer be required to specify any particular grade of the metal, CPA has announced. There is no expectancy that ores will be more readily available than other grades hereafter, CPA said.

Applicants for allocations of antimony for export, except to Canada, must hereafter apply by

letter instead of by form, but only after they have received a validated export license from the Office of International Trade, Dept. of Commerce. Their letters to CPA must furnish the following information: Export license numbers and validation date; the country to which antimony is to be exported; the name of the proposed supplier, and the quantity allowed to be exported under the licenses.

A provision of order M-112 permitting producers of antimony ore or concentrates to deliver in any calendar month quantities totaling not more than 50 tons "contained antimony" without allocation is also revoked.

Raise Antimony Price

New York

••• The National Lead Co. who recently bought out the property of the Texas Mining & Smelting Co. has announced a price increase of 4¾¢ per lb on antimony. This brings the price of the metal at Laredo, Tex., to 33.00¢ per lb as compared with the wartime price of 14.50¢. The producer states that the higher price was required by increasing costs, coupled with the need for a higher ore price to encourage greater Mexican production. Antimony continues in very short supply and this move is expected to bring out sufficient additional tonnage to approach requirements more closely.

Speed Nickel Oxide Plant

Toronto

••• International Nickel Co. of Canada, Ltd., expects to be well started on its \$10,000,000 building program at Copper Cliff in May. Materials needed for the \$9,000,000 sintering plant started in 1945 and held up since by supply bottlenecks are expected to be available within the next two months. The plant, planned for production within two years, will provide a short-cut in the production of nickel oxide sinter for steel mills.

Nonferrous Metals Prices

Cents per pound

	Mar. 12	Mar. 13	Mar. 14	Mar. 15	Mar. 17	Mar. 18
Copper, electro, Conn.	21.50	21.50	21.50	21.50	21.50	21.50
Copper, Lake, Conn.	21.625	21.625	21.625	21.625	21.625	21.625
Tin, Straits, New York	70.00	70.00	70.00	70.00	70.00	70.00
Zinc, East St. Louis	10.50	10.50	10.50	10.50	10.50	10.50
Lead, St. Louis	14.80	14.80	14.80	14.80	14.80	14.80

NONFERROUS METALS PRICES

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, f.o.b. shipping point (min. 10,000 lb)	15.00
Aluminum pig, f.o.b. shipping point	14.00
Antimony, American Laredo Tex.	33.00
Beryllium copper, 3.75-4.25% Be; dollars per lb contained Be	\$14.75
Beryllium aluminum, 5% Be; dollars per lb contained Be	\$27.50
Cadmium, del'd	\$1.75
Cobalt, 97-99% (per lb)	\$1.50 to \$1.57
Copper, electro, Conn. Valley	21.50
Copper, lake, Conn. Valley	21.625
Gold, U. S. Treas., dollars per oz.	\$35.00
Indium, 99.8%, dollars per troy oz.	\$2.25
Iridium, dollars per troy oz.	\$110.00
Lead, St. Louis	14.80
Lead, New York	15.00
Magnesium, 99.8+%,	20.50
Magnesium, sticks, carlots	36.00
Mercury, dollars per 76-lb flask, f.o.b. New York	\$88 to \$90
Nickel, electro, f.o.b. New York	37.67
Palladium, dollars per troy oz.	\$24.00
Platinum, dollars per troy oz.	\$58 to \$61
Silver, New York, cents per oz.	74.50
Tin, Straits, New York	70.00
Zinc, East St. Louis	10.50
Zinc, New York	11.005
Zirconium copper, 6 pct Zr, per lb contained Zr	\$6.00

Remelted Metals

Brass Ingot

(Cents per lb, in carloads)

85-5-5-5 ingot	
No. 115	21.50
No. 120	21.90
No. 123	20.50
80-10-10 ingot	
No. 305	24.50
No. 315	23.00
88-10-2 ingot	
No. 210	27.25
No. 215	26.25
No. 245	23.50
Yellow ingot	
No. 405	17.00
Manganese Bronze	
No. 421	19.25

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys:	
0.30 copper max.	17.75-18.00
0.60 copper, max.	17.50-17.75
Piston alloys (No. 122 type)	16.25-16.50
No. 12 alum. (No. 2 grade)	15.50-15.75
108 alloy	15.75-16.00
195 alloy	16.25-16.50
AXS-679	15.75-16.00
Steel deoxidizing aluminum, notch-bar, granulated or shot	
Grade 1-95 pct-97 1/2 pct ..	16.75-17.00
Grade 2-92 pct-95 pct ..	15.75-16.00
Grade 3-90 pct-92 pct ..	15.25-15.50
Grade 4-85 pct-90 pct ..	14.75-15.00

Electroplating Supplies

Anodes

(Cents per lb, f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	36 1/2
Electrodeposited	31 1/2
Rolled, oval, straight, delivered ..	32 1/2
Brass, 80-20, frt allowed	
Cast, oval, 15 in. or longer	33
Zinc, Cast, 99.99	18 1/2
Nickel, 99 pct plus, frt allowed	
Cast	51
Rolled, depolarized	52
Silver, 999 fine	
Rolled, 1000 oz lots, per oz.	88 1/2

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	40.50
Copper sulphate, 99.5, crystals, bbls	11.50
Nickel salts, single, 425 lb bbls, frt allowed	14.50
Silver cyanide, 100 oz. lots, per oz 70%	
Sodium cyanide, 96 pct, domestic, 200 lb drums	15.00
Zinc cyanide, 100 lb drums	34.00
Zinc, sulphate, 89 pct, crystals, bbls, frt allowed	7.75

Mill Products

Aluminum

(Cents per lb, base, subject to extras for quantity, gage, size, temper and finish)

Drawn tubing: 2 to 3 in. OD by 0.065 in. wall: 3S, 43.5¢; 52S-O, 67¢; 24S-T, 71¢; base, 30,000 lb.

Plate: 1/4 in. and heavier: 2S, 3S, 21.2¢; 52S, 24.2¢ 61S, 23.8¢; 24S, 24S-AL, 24.2¢; 75S, 75S-AL, 30.5¢; base, 30,000 lb.

Flat Sheet: 0.136 in. thickness: 2S, 3S, 23.7¢; 52S, 27.2¢; 61S, 24.7¢; 24S-O, 24S-OAL, 26.7¢; 75S-O, 75S-OAL, 32.7¢; base, 30,000 lb.

Extruded Solid Shapes: factor determined by dividing the perimeter of the shape by its weight per foot. For factor 1 through 4, 3S, 26¢; 14S, 32.5¢; 24S, 35¢; 53S, 61S, 28¢; 63S, 27¢; 75S, 45.5¢; base, 30,000 lb.

Wire, Rod and Bar: screw machine stock, rounds, 17S-T, 1/4 in., 29.5¢; 1/2 in., 37.5¢; 1 in., 26¢; 2 in., 24.5¢; hexagons, 1/4 in., 35.5¢; 1/2 in., 30¢; 1 in., 2 in., 27¢; base, 5000 lb. Rod: 2S, 3S, 1 1/4 to 2 1/4 in. diam, rolled, 23¢; cold-finished, 23.5¢ base, 30,000 lb. Round Wire: drawn, coiled, B & S gage 17-18: 2S, 3S, 33.5¢; 56S, 39.5¢; 10,000 lb base. B & S gage 00-1: 2S, 3S, 21¢; 56S, 30.5¢. B & S 15-16: 2S, 3S, 32.5¢; 56S, 38¢; base, 30,000 lb.

Magnesium

(Cents per lb, f.o.b. mill)

Sheet and Plate: Ma. FSA, 1/4 in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 3, 58¢-60¢; 10, 59¢-61¢; 14, 69¢-74¢; 18, 79¢-81¢; 18, 87¢-89¢; 22, \$1.25-\$1.31; 24, \$1.71-\$1.75. Base quantity 30,000 lb.

Round Rod: M, diam in. 1/4, 55¢; 1/2, 47¢; 3/4, 46¢; 1, 45¢; 1 1/4, 44¢; 1 1/2, 43.5¢; 2, 42.5¢; 3, 41.5¢; 4, 42.5¢; 5, 43.5¢; 6 & 7 in., 44¢. Base price, 5000-10,000 lb.

Square and Hexagonal Bar: M, diam in. 1/4, 58¢; 1/2, 50¢; 3/4, 48¢; 1, 47.5¢; 1 1/4, 46.5¢; 1 1/2, 45.5¢; 2, 44.5¢; 3, 43.5¢; 4 & 5 in., 44.5¢; 6 & 7 in., 45¢. Base quantity, 5000-10,000 lb.

Tubing: Varies with wall thickness and outside diameter.

Nickel and Monel

(Cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	54	43
No. 35 sheets		41
Strip, cold-rolled	60	44
Rod		
Hot-rolled	50	39
Cold-drawn	55	44
Angles, hot-rolled	50	39
Plates	52	41
Seamless tubes	83	71
Shot and blocks		31

Zinc

(Cents per lb, f.o.b. mill)

Sheet, L.c.l.	15.50
Ribbon, ton lots	14.50
Plates	
Small	13.50
Large, over 12 in.	14.50

Copper, Brass, Bronze

(Cents per lb)

	Extruded Shapes	Rods	Sheets
Copper	32.78		32.93
Copper, hot rolled.		29.28	
Copper, drawn		30.28	
Low brass	39.13	30.32	30.63
High brass	37.38	28.57	28.88
Red brass	39.74	30.93	31.24
Naval brass	28.73	27.48	33.42
Brass, free cutting	27.23	23.64	
Commercial bronze	40.86	32.05	32.36
Manganese bronze	32.28	30.78	36.92
Phosphor bronze, 5 pct.		51.00	50.75
Muntz metal	28.42	27.17	31.61
Everdur, Herculey			
Olympic, etc.	36.30	36.65	37.71
Nickel silver, 5 pct.	40.54	39.53	37.92
Architectural bronze	27.23		

Scrap Metals

(Dealers' buying prices, f.o.b. New York in cents per pound.)

Brass Mill Scrap

(Lots of less than 15,000 lb.)

Cartridge brass turnings	14 1/2
Loose yellow brass trimmings	15 1/2

Copper and Brass

No. 1 heavy copper and wire	16 1/2-17
No. 2 heavy copper and wire	15 1/2-16
Light copper	14 1/2-15
Auto radiators (unsweated)	10 1/2-11 1/2
No. 1 composition	14 1/2-15
No. 1 composition turnings ..	13 1/2-14
Clean red car boxes	12 -12 1/2
Cocks and faucets	11 1/2-11 3/4
Mixed heavy yellow brass ..	9 1/2-10 1/2
Old rolled brass	9 1/2-10
Brass pipe	11 1/2-11 3/4
New soft brass clippings ..	13 -13 1/2
Brass rod ends	12 1/2-12 3/4
No. 1 brass rod turnings ..	12 -12 1/2

Aluminum

Alum. pistons with struts	4 1/2-5
Aluminum crankcases	6 1/2-7
2S aluminum clippings	8 1/2-8 3/4
Old sheet & utensils	6 1/2-7
Mixed borings and turnings ..	2 1/2-3
Misc. cast aluminum	6 1/2-6 3/4
Dural clips (24S)	5 1/2-6

Zinc

New zinc clippings	7 -7 1/2
Old zinc	5 1/2-5 3/4
Zinc routings	3 -3 1/2
Old die cast scrap	3 -3 1/2

Nickel and Monel

Pure nickel clippings	22 -23
Clean nickel turnings	17 -18
Nickel anodes	19 1/2-20 1/2
Nickel rod ends	20 -21
New Monel clippings	14 -15
Clean Monel turnings	9 -10
Old sheet Monel	12 -12 1/2
Old Monel castings	10 -11
Inconel clippings	10 -11
German silver clippings, mixed ..	10 1/2-11
German silver turnings, mixed 7	7 -7 1/2

Lead

Soft scrap lead	12 -12 1/2
Battery plates (dry)	7 -7 1/2

Miscellaneous

Block tin	60
No. 1 pewter	46 -48
No. 1 auto babbitt	35 -36
Mixed common babbitt ..	12 -12 1/2
Solder joints	13 1/2-13 3/4
Siphon tops	38 -39
Small foundry type	15 -15 1/2
Monotype	13 1/2-14
Lino and stereotype	12 -13
Electrotype	11 -12
New type shell cuttings (nom) ..	13 -13 1/2
Clean hand picked type shells ..	5 1/2-6
Lino and stereo dross	6 -6 1/2
Electro dross	4 -4 1/2

Lead Products

(Cents per lb)

F.o.b. shipping point freight collect. Freight equalized with nearest free delivery point.	
Full lead sheets	18.25
Cut lead sheets	18.75
Lead pipe, manufacturing point ..	17.50
Lead traps and bends	List +42%
Combination lead and iron bends and ferrules, also combination lead and iron ferrules	List +42%
Lead wool	19.50

SCRAP

... News and Market Activities

Prices Rise as Usual; Shipments Are Better

New York

••• Amid the confusion of a complex market, two facts stood out this week: Prices were higher and so were shipments. Price advances were at about the same rate as in the past few weeks. Shipments, despite record peacetime steel rates, were so good that a few mills have actually been able to build up very slight inventories.

With the local market steady at \$38, Pittsburgh mills again upped their offer for scrap originating outside of the district; some paying \$46 and more a ton. But high Pittsburgh offers were siphoning material out of Buffalo's normal buying areas so a Buffalo mill cracked back with a healthy boost—to \$41 and even \$43 a ton. This, said several scrap sources, had to be done to feed the Buffalo mills.

Boston dealers whipped their quotations up by a smart \$3, in line with New York increases which sent No. 1 scrap up another \$1 in the big city to \$37. Birmingham prices took a \$3 zoom, while in the Valley the out-of-district material gained \$2.50 for the week. This sent the out-of-district quotation (the top half of the Youngstown quotation on p. 119) to a \$45 average. In the Quaker City area a \$1.50 rise put the top of the spread there at \$41.50.

Major scrap consuming centers, including Pittsburgh, Chicago and Philadelphia, reported a bright picture on shipments. Few mills are able to do anything toward accumulating any reserves and they have further indicated that they would not be very smart to do so at these prices. Even with the coming of spring, trade sources believe there'll be no mill stockpiling until prices drop.

Meanwhile brokers are getting nervous stomachs trying to cover orders. Small orders for quick coverage are the rule.

PITTSBURGH—A car embargo placed on one consumer in the adjacent area because of a pileup of cars has brought some relatively high priced scrap into the market. Actually, one major consumer reported this week that production and dealer scrap is moving much more freely, and mill stocks are better in

Pittsburgh now than they have been for several months. Mills are holding to the local \$38 a ton price, but out of district scrap is still moving into Pittsburgh in heavy quantities at prices ranging up to \$46 a ton. However, the average out of district price is in the neighborhood of \$44 a ton. The cast market is stronger and the demand for scrap rails and cut rails has pushed these prices higher.

CHICAGO—At the present price levels all dealers and other persons holding scrap are moving as much as they can as they are convinced that present high prices cannot hold too long. The mills in this area report their shipments in the past week have been substantial and in some cases inventories have been slightly replenished. Railroad specialties continue at premium prices and scarcity of malleable has caused its cost to skyrocket in the case of desperate consumers. Railroad lists in the past week were small and the roads report the market in such a chaotic state that some of them are withholding sales until things level off.

PHILADELPHIA—The scrap market here continues its upward rise with practically all grades selling at increased prices last week. Heavy melting moved up to a spread of \$40 to \$41.50. This price reflects the sale of railroad heavy melting at \$41.50. The pig iron shortage in this district has created a more critical need of scrap than ever. However it is reported that shipments of scrap are moving as freely as permitted by the car shortage. Cast grades are also higher with cupola cast selling at a range of \$49 to \$51.

NEW YORK—Early in the week the market here was relatively unaffected by the sharp increases in other districts and steel grades moved up only \$1 a ton across the board. Cast iron scrap remains tight but with no price rises. Brokers report that shipments have been excellent with dealers moving everything they can lay their hands on.

DETROIT—Heavy buying pressure continues on the Detroit market with the result that machine shop turnings, short shovel turnings, cast iron borings and mixed borings and turnings moved up \$2.50 during the past week. With large mill buyers in this area maintaining their previous offers the price of heavy melting and other openhearth grades remains unchanged, although sales of limited tonnages to outside buyers at \$39 and \$40 for openhearth grades have been reported. Most sources here believe that today's prices are bringing out all available scrap. The fact that some usable material is now being sold as scrap rather than as used leads some observers to believe the market may be approaching its peak.

CLEVELAND—While shipments to consumers are good, local and out-of-district scrap markets are pretty well con-

fused. Resistance to any advance in the price of scrap originating in local basing points is growing, but break-overs in other districts make such resistance only temporarily effective. Generally, consumers are bidding for every available car. One consumer in the valley has been tied up with a railroad embargo for several days, but this situation was not expected to last long.

BOSTON—Starting with heavy steel up \$1 at \$34 a ton, it then moved to \$35 and early this week hit \$36, a net gain of \$3 for the week. It was the 11th consecutive week prices advanced. Steel scrap is now \$11 a ton higher than on Jan. 1. To say that brokers are dizzy is putting it mildly. They are playing close to their shirts, shipping to nearest possible consuming points and expect something to break hourly. Prices on other material are stronger but lack the animation of those for heavy steel.

BUFFALO—To put a halt to raiding of its markets in this vicinity a leading consumer here went up sharply to \$41 and even to \$43 for heavy melting scrap in areas outside the local market. Turnings gained \$1 in sympathy and rail specialties were \$1 to \$3 nominally higher. Low phosphorous plate also was raised. Although electric furnaces were reported fairly well fixed for scrap. Whether the latest rise has expanded shipments is debatable, but it certainly has speeded up the movement.

CINCINNATI—The district scrap market has held steady the past week, with dealers and brokers trying hard to maintain a settled market. Some reports of short sales are heard, but prices do not warrant too optimistic a trend for short sales. Mills are still holding to reciprocal arrangements to insure more scrap for their inventories.

BIRMINGHAM—Following increases in other districts, scrap prices in this market have advanced generally with openhearth grades up \$3 per ton. The high prices are bringing out extremely heavy tonnages of all types of material.

ST. LOUIS—The market continues strong, and mills in the St. Louis industrial district continue to pay high prices because they are forced to do so to meet competition from other markets. Even so receipts are still short of consumption. St. Louis San Francisco R.R. has a list of 34 cars, closing Friday.

TORONTO—While there was some movement of scrap in the Canadian markets during the week, bad road conditions and shortage of freight cars continued to hamper transportation of scrap to and from dealers. The scrap supply situation in Canada, however, has reached the critical stage. Irving Selig, in an address to the annual convention of the Secondary Materials Association here, stated that price controls are slowly strangling Canada's sources of scrap steel supply and are crippling foundries and heavy equipment fabricators.

IRON AND STEEL SCRAP PRICES

PITTSBURGH

Per gross ton delivered to consumer:†

No. 1 hvy. melting.....	\$38.00 to \$44.00
RR. hvy. melting.....	37.50 to 38.00
No. 2 hvy. melting.....	38.00 to 44.00
RR. scrap rails.....	43.00 to 44.00
Rails 2 ft. and under.....	47.00 to 48.00
No. 1 comp'd bundles.....	38.00 to 44.00
Hand bld. new shts.....	38.00 to 44.00
Hvy. axle turn.....	38.00 to 44.00
Hvy. steel forge turn.....	38.00 to 44.00
Mach. shop turn.....	33.00 to 34.00
Short shov. turn.....	34.00 to 35.00
Mixed bor. and turn.....	33.00 to 34.00
Cast iron borings.....	33.00 to 34.00
No. 1 cupola cast.....	44.00 to 45.00
Heavy breakable cast.....	38.00 to 39.00
Malleable.....	44.00 to 45.00
RR. knuck. and coup.....	45.00 to 46.00
RR. coil springs.....	45.00 to 46.00
Rail leaf springs.....	45.00 to 46.00
Roll steel wheels.....	45.00 to 46.00
Low phos.....	44.00 to 45.00

CHICAGO

Per gross ton delivered to consumer:†

No. 1 hvy. melting.....	\$35.50 to \$39.00
No. 2 hvy. melting.....	35.50 to 39.00
No. 1 bundles.....	35.50 to 39.00
No. 2 dealers' bundles.....	35.50 to 39.00
Bundled mach. shop turn.....	35.50 to 39.00
Galv. bundles.....	33.50 to 34.00
Mach. shop turn.....	30.50 to 31.00
Short shov. turn.....	32.50 to 33.00
Cast iron borings.....	31.50 to 32.00
Mix. borings & turn.....	30.50 to 31.00
Los. phos. hvy. forge.....	40.00 to 41.50
Low phos. plates.....	38.50 to 42.50
No. 1 RR. hvy. melt.....	36.50 to 37.00
Rerolling rails.....	45.25 to 46.00
Miscellaneous rails.....	43.00 to 44.00
Angles & splice bars.....	43.00 to 45.00
Locomotive tires, cut.....	40.00 to 43.00
Cut bolster & side frames.....	39.00 to 40.00
Standard stl. car axles.....	43.00 to 44.00
No. 3 steel wheels.....	40.50 to 41.00
Couplers & knuckles.....	43.50 to 45.00
Malleable.....	48.00 to 49.00
No. 1 mach. cast.....	46.00 to 47.00
Rails 2 ft. and under.....	49.00 to 50.00
No. 1 agricul. cast.....	38.50 to 39.00
Hvy. breakable cast.....	37.50 to 38.00
RR. grate bars.....	40.00 to 40.50
Cast iron brake shoes.....	40.00 to 42.00
Stove plate.....	41.00 to 42.00
Cast iron carwheels.....	40.00 to 42.00

CINCINNATI

Per gross ton delivered to consumer:†

No. 1 hvy. melting.....	\$36.00 to \$38.00
No. 2 hvy. melting.....	36.00 to 38.00
No. 1 bundles.....	36.00 to 38.00
No. 2 bundles.....	36.00 to 38.00
Mach. shop turn.....	30.00 to 31.00
Shoveling turn.....	30.00 to 32.00
Cast iron borings.....	29.00 to 31.00
Mixed bor. & turn.....	29.00 to 31.00
Low phos. plate.....	40.00 to 42.00
No. 1 cupola cast.....	49.00 to 50.00
Hvy. breakable cast.....	35.00 to 36.00
Stove plate.....	31.00 to 32.00
Scrap rails.....	40.00 to 41.00

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars

No. 1 hvy. melting.....	\$36.00
No. 2 hvy. melting.....	36.00
Nos. 1 and 2 bundles.....	36.00
Busheling.....	36.00
Turnings, shoveling.....	\$28.50 to 29.00
Machine shop turn.....	27.00
Mixed bor. & turn.....	27.00
Cl'n cast. chem. bor.....	28.50 to 29.00
No. 1 machinery cast.....	40.00 to 45.00
No. 2 machinery cast.....	40.00 to 45.00
Heavy breakable cast.....	40.00 to 45.00
Stove plate.....	40.00 to 45.00

DETROIT

Per gross, ton, brokers' buying prices, f.o.b. cars:

No. 1 hvy. melting.....	\$34.75 to \$35.25
No. 2 hvy. melting.....	34.75 to 35.25
No. 1 bundles.....	34.75 to 35.25
New busheling.....	34.75 to 35.25
Flashings.....	34.75 to 35.25
Mach. shop turn.....	28.00 to 28.50
Short shov. turn.....	28.00 to 28.50
Cast iron boring.....	28.00 to 28.50
Mixed bor. & turn.....	28.00 to 28.50
Low phos. plate.....	36.75 to 37.25
No. 1 cupola cast.....	41.25 to 45.25
Hvy. breakable cast.....	37.25 to 39.25
Stove plate.....	37.25 to 39.25
Automotive cast.....	48.50 to 50.00

PHILADELPHIA

Per gross ton delivered to consumer:†

No. 1 hvy. melting.....	\$40.00 to \$41.50
No. 2 hvy. melting.....	40.00 to 41.50
No. 1 bundles.....	40.00 to 41.50
No. 2 bundles.....	40.00 to 41.50
Mach. shop turn.....	29.00 to 30.00
Shoveling turn.....	30.00 to 31.00
Mixed bor. & turn.....	29.00 to 30.00
Clean cast chemical bor.....	35.00 to 36.00
No. 1 cupola cast.....	49.00 to 51.00
Hvy. breakable cast.....	46.00 to 48.00
Cast. charging box.....	46.00 to 48.00
Clean auto cast.....	49.00 to 51.00
Hvy. axle forge turn.....	49.00 to 51.00
Low phos. plate.....	42.50 to 44.00
Low phos. punchings.....	42.50 to 44.00
Low phos. bundles.....	41.50 to 43.00
RR. steel wheels.....	43.00 to 44.50
RR. coil springs.....	43.00 to 44.50
RR. malleable.....	49.00 to 51.00

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages. Where substantial tonnages of open hearth grades come into a consuming district from outside of that district, the upper range of the price quoted here is the representative average delivered price of the bulk of this incoming material; the lower range shows the price being paid for scrap originating within the consuming district.

ST. LOUIS

Per gross ton delivered to consumer:†

No. 1 hvy. melting.....	\$35.50 to \$36.50
Bundled sheets.....	35.50 to 36.50
Mach. shop turn.....	30.00 to 31.00
Locomotive tires, uncut.....	37.00 to 38.00
Mis. std. sec. rails.....	40.00 to 42.00
Rerolling rails.....	42.00 to 44.00
Steel angle bars.....	39.00 to 40.00
Rails 3 ft. and under.....	42.00 to 44.00
RR. springs.....	40.00 to 41.00
Steel car axles.....	38.00 to 40.00
Stove plate.....	36.00 to 38.00
Grate bars.....	35.00 to 36.00
Brake shoes.....	35.00 to 36.00
Malleable.....	43.00 to 45.00
Cast iron car wheels.....	40.00 to 41.00
No. 1 machinery cast.....	39.00 to 40.00
Breakable cast.....	37.00 to 38.00

BIRMINGHAM

Per gross ton delivered to consumer:†

No. 1 hvy. melting.....	\$36.00
No. 2 hvy. melting.....	36.00
No. 2 bundles.....	36.00
No. 1 busheling.....	36.00
Long turnings.....	\$24.00 to 25.00
Shoveling turnings.....	27.50 to 28.00
Cast iron borings.....	28.00
Bar crops and plate.....	38.00 to 38.50
Structural and plate.....	38.00 to 38.50
No. 1 cast.....	37.50 to 42.50
Stove plate.....	37.00 to 40.00
Steel axles.....	36.00 to 37.00
Scrap rails.....	38.00 to 39.00
Rerolling rails.....	39.00 to 40.00
Angles & splice bars.....	38.00 to 39.00
Rails 3 ft. & under.....	38.00 to 41.00
Cast iron carwheels.....	32.00 to 32.50

YOUNGSTOWN

Per gross ton delivered to consumer:†

No. 1 hvy. melting.....	\$38.00 to \$45.00
No. 2 hvy. melting.....	38.00 to 45.00
Low phos. plate.....	44.00 to 46.50
Mach. shop turn.....	32.50 to 33.00
Short shov. turn.....	33.00 to 34.00
Cast iron borings.....	33.00 to 34.00
Elec. furnace punch.....	44.00 to 46.50

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting.....	\$37.00
No. 2 hvy. melting.....	37.00
Comp. black bundles.....	37.00
Comp. galv. bundles.....	35.00
Mach. shop turn.....	\$27.50 to 28.00
Mixed bor. & turn.....	27.50 to 28.00
Shoveling turn.....	29.50 to 30.00
No. 1 cupola cast.....	43.00 to 45.00
Hvy. breakable cast.....	41.00 to 43.00

†See box above

Charging box cast.....	\$41.00 to \$43.00
Stove plate.....	41.00 to 43.00
Clean auto cast.....	41.00 to 43.00
Unstrip. motor blks.....	39.00 to 41.00
Cl'n chem. cast bor.....	29.00

BUFFALO

Per gross ton delivered to consumer:†

No. 1 hvy. melting.....	\$37.50 to \$41.00
No. 2 hvy. melting.....	37.50 to 41.00
No. 1 bundles.....	37.50 to 41.00
No. 2 bundles.....	37.50 to 41.00
Mach. shop turn.....	29.00 to 30.00
Shoveling turn.....	31.00 to 32.00
Cast iron borings.....	27.00 to 28.00
Mixed bor. & turn.....	29.00 to 30.00
No. 1 cupola cast.....	35.00 to 40.00
Charging box cast.....	29.00 to 30.00
Stove plate.....	30.00 to 35.00
Clean auto cast.....	35.00 to 40.00
Malleable.....	45.00 to 47.00
Low phos. plate.....	40.00 to 43.00
Scrap rails.....	30.00 to 32.00
Rails 3 ft. & under.....	38.00 to 40.00
RR. steel wheels.....	38.00 to 40.00
Cast iron carwheels.....	38.00 to 40.00
RR. coil & leaf spgs.....	38.00 to 40.00
RR. knuckles & coup.....	38.00 to 40.00
No. 1 busheling.....	37.50 to 41.00

CLEVELAND

Per gross ton delivered to consumer:†

No. 1 hvy. melting.....	\$37.50 to \$39.50
No. 2 hvy. melting.....	37.50 to 39.50
Compressed sheet stl.....	37.50 to 39.50
Drop forge flashings.....	37.50 to 39.50
No. 2 bundles.....	37.50 to 39.50
Mach. shop turn.....	31.00 to 32.00
Short shovel.....	32.00 to 33.00
No. 1 busheling.....	37.50 to 39.50
Steel axle turn.....	37.50 to 39.50
Cast iron borings.....	32.00 to 33.00
Mixed bor. & turn.....	32.00 to 33.00
No. 1 machinery cast.....	45.00 to 50.00
Malleable.....	45.00 to 50.00
Railroad cast.....	45.00 to 50.00
Railroad grate bars.....	40.00 to 45.00
Stove plate.....	40.00 to 45.00
RR. hvy. melting.....	37.00 to 38.00
Rails 3 ft. & under.....	48.00 to 50.00
Rails 18 in. & under.....	48.00 to 50.00
Elec. furnace punch.....	41.50 to 44.50

SAN FRANCISCO

Per gross ton delivered to consumer:

No. 1 hvy. melting.....	\$19.50
No. 2 hvy. melting.....	19.50
No. 2 bales.....	19.50
No. 3 bales.....	16.00
Mach. shop turn.....	18.00
Elec. furn. 1 ft. und.....	25.00
No. 1 cupola cast.....	\$32.00 to 33.00
RR. hvy. melting.....	20.50

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting.....	\$19.50
No. 2 hvy. melting.....	19.50
No. 1 bales.....	19.50
No. 2 bales.....	19.50
No. 3 bales.....	16.00
Mach. shop turn.....	14.50
No. 1 cupola cast.....	\$35.00 to 36.00
RR. hvy. melting.....	20.50

SEATTLE

Per gross ton delivered to consumer:

No. 1 & No. 2 hvy. melting.....	\$20.00
Elec. furn. 1 ft. und.....	22.50
No. 1 cupola cast.....	29.00
RR. hvy. melting.....	21.00

HAMILTON, QNT.

Per gross ton delivered to consumer:

Cast grades f.o.b. shipping point	
Heavy melting.....	\$17.50*
No. 1 bundles.....	17.50*
No. 2 bundles.....	17.00*
Mixed steel scrap.....	15.50*
Rails, remelting.....	18.50*
Rails, rerolling.....	21.50*
Bushelings.....	13.00*
Mixed borings & turnings.....	12.50*
Electric furnace bundles.....	20.50*
Manganese steel scrap.....	20.00*
No. 1 cast.....	19.00*
Stove plate.....	17.50*
Car wheels, cast.....	19.50*
Malleable iron.....	16.00*
* Ceiling price	

Comparison of Prices . .

Advances over past week in Heavy Type, declines in *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

Flat-Rolled Steel:	Mar. 18, 1947	Mar. 11, 1947	Feb. 18, 1947	Mar. 19, 1946
(cents per pound)				
Hot-rolled sheets	2.50	2.50	2.50	2.425
Cold-rolled sheets	3.20	3.20	3.20	3.275
Galvanized sheets (10 ga.)	3.55	3.55	3.55	4.05*
Hot-rolled strip	2.50	2.50	2.50	2.35
Cold-rolled strip	3.20	3.20	3.20	3.05
Plates	2.65	2.65	2.65	2.50
Plates, wrought iron	5.95	5.95	5.95	4.112
Stain's c-r strip (No. 302)	30.30	30.30	30.30	28.00

*24 ga

Fin and Terneplate:

(dollars per base box)

Tinplate, standard cokes.	\$5.75	\$5.75	\$5.75	\$5.00
Tinplate, electro (0.50 lb)	5.05	5.05	5.05	4.50
Special coated mfg. ternes	4.90	4.90	4.90	4.30

Bars and Shapes:

(cents per pound)

Merchant bars	2.60	2.60	2.60	2.50
Cold-finished bars	3.20	3.20	3.20	3.10
Alloy bars	3.05	3.05	3.05	2.92
Structural shapes	2.50	2.50	2.50	2.35
Stainless bars (No. 302)	26.00	26.00	26.00	24.00
Wrought iron bars	6.15	6.15	6.15	4.76

Wire and Wire Products:

(cents per pound)

Bright wire	3.30	3.30	3.30	3.05
Wire nails	3.75	3.75	3.75	3.25

Rails:

(dollars per 100 lb)

Heavy rails	\$2.50	\$2.50	\$2.50	\$43.39*
Light rails	2.85	2.85	2.85	49.18*

*per net ton

Semifinished Steel:

(dollars per gross ton)

Rerolling billets	\$42.00	\$42.00	\$42.00	\$39.00
Sheet bars	50.00	50.00	50.00	38.00
Slabs, rerolling	42.00	42.00	42.00	39.00
Forging billets	50.00	50.00	50.00	47.00
Alloy blooms, billets, slabs	61.00	61.00	61.00	58.43

Wire Rods and Skelp:

(cents per pound)

Wire rods	2.55	2.55	2.55	2.30
Skelp	2.35	2.35	2.35	2.05

Pig Iron:

(per gross ton)

	Mar. 18, 1947	Mar. 11, 1947	Feb. 18, 1947	Mar. 19, 1946
No. 2, foundry, Phila.	\$36.51	\$36.51	\$32.51	\$28.34
No. 2, Valley furnace	33.50	33.50	30.50	26.50
No. 2, Southern, Cin'ti.	34.75	34.75	31.75	26.94
No. 2, Birmingham	29.88	29.88	26.88	22.88
No. 2, foundry, Chicago†	33.00	33.00	30.50	26.50
Basic, del'd eastern Pa.	36.92	36.92	33.67	27.84
Basic, Valley furnace	33.00	33.00	30.00	26.00
Malleable, Chicago†	33.50	33.50	30.50	26.50
Malleable, Valley	33.50	33.50	30.50	26.50
Charcoal, Chicago	45.99	45.99	42.99	42.34
Ferromanganese‡	135.00	135.00	135.00	135.00

† The switching charge for delivery to foundries in the Chicago district is \$1 per ton.

‡ For carlots at seaboard.

Scrap:

(per gross ton)

Heavy melt'g steel, P'gh.	\$41.00	\$39.50	\$35.50	\$20.00
Heavy melt'g steel, Phila.	40.75	39.50	33.50	18.75
Heavy melt'g steel, Ch'go	37.25	37.25	32.25	18.75
No. 1, hy. comp. sheet, Det.	35.00	35.00	30.00	17.32
Low phos. plate, Youngs'n	45.25	43.50	37.25	22.50
No. 1, cast, Pittsburgh	44.50	41.50	42.50	20.00
No. 1, cast, Philadelphia	50.00	49.00	46.00	20.00
No. 1, cast, Chicago	46.50	44.25	44.25	20.00

Coke, Connellsville:

(per net ton at oven)

Furnace coke, prompt	\$9.00	\$9.00	\$9.00	\$7.50
Foundry coke, prompt	10.25	10.25	10.25	9.00

Nonferrous Metals:

(cents per pound to large buyers)

Copper, electro., Conn.	21.50	21.50	19.75	12.00
Copper, Lake, Conn.	21.625	21.625	19.625	12.00
Tin, Straits, New York	70.00	70.00	70.00	52.00
Zinc, East St. Louis	10.50	10.50	10.50	8.25
Lead, St. Louis	14.80	14.80	12.80	6.35
Aluminum, virgin	15.00	15.00	15.00	15.00
Nickel, electrolytic	37.67	37.67	37.67	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	33.00	28.25	28.25	14.50

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942 and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite prices for the current quarter are an estimate based on finished steel shipments for the previous quarter. These figures will be revised when the actual data of shipments for this quarter are compiled.

Composite Prices . .

FINISHED STEEL

Mar. 18, 1947	2.86354¢ per lb.
One week ago	2.86354¢ per lb.
One month ago	2.86354¢ per lb.
One year ago	2.54490¢ per lb.

HIGH

1947...	2.86354¢	2.86354¢
1946...	2.83599¢ Dec. 31	2.54490¢ Jan. 1
1945...	2.44104¢ Oct. 2	2.38444¢ Jan. 2
1944...	2.30837¢ Sept. 5	2.21189¢ Oct. 5
1943...	2.29176¢	2.29176¢
1942...	2.28249¢	2.28249¢
1941...	2.43078¢	2.43078¢
1940...	2.30467¢ Jan. 2	2.24107¢ Apr. 16
1939...	2.35867¢ Jan. 3	2.26689¢ May 16
1938...	2.58414¢ Jan. 4	2.27207¢ Oct. 18
1937...	2.58414¢ Mar. 9	2.32263¢ Jan. 4
1936...	2.32263¢ Dec. 28	2.05200¢ Mar. 10
1935...	2.07642¢ Oct. 1	2.06492¢ Jan. 8
1934...	2.15367¢ Apr. 24	1.95757¢ Jan. 2
1933...	1.95578¢ Oct. 3	1.75836¢ May 2
1932...	1.89196¢ July 5	1.83901¢ Mar. 1
1931...	1.99626¢ Jan. 13	1.86586¢ Dec. 29
1930...	2.25488¢ Jan. 7	1.97319¢ Dec. 9
1929...	2.31773¢ May 28	2.26498¢ Oct. 29

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 pct of the United States output. Index recapitulated in Aug. 28, 1941, issue.

PIG IRON

.....	\$33.15 per gross ton
.....	\$33.15 per gross ton
.....	\$30.15 per gross ton
.....	\$26.12 per gross ton

HIGH

\$33.15 Mar. 11	\$30.14 Jan. 7
30.14 Dec. 10	25.37 Jan. 1
25.37 Oct. 23	23.61 Jan. 2
\$23.61	\$23.61
23.61	23.61
23.61	23.61
\$23.61 Mar. 20	\$23.45 Jan. 2
23.45 Dec. 23	22.61 Jan. 2
22.61 Sept. 19	20.61 Sept. 12
23.25 June 21	19.61 July 6
23.25 Mar. 9	20.25 Feb. 16
19.74 Nov. 24	18.73 Aug. 11
18.84 Nov. 5	17.83 May 14
17.90 May 1	16.90 Jan. 27
16.90 Dec. 5	13.56 Jan. 3
14.81 Jan. 5	13.56 Dec. 6
15.90 Jan. 6	14.79 Dec. 15
18.21 Jan. 7	15.90 Dec. 16
18.71 May 14	18.21 Dec. 17

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

SCRAP STEEL

.....	\$39.67 per gross ton
.....	\$38.75 per gross ton
.....	\$33.75 per gross ton
.....	\$19.17 per gross ton

HIGH

\$39.67 Mar. 18	\$31.00 Jan. 7
31.17 Dec. 24	19.17 Jan. 1
19.17 Jan. 2	18.92 May 22
19.17 Jan. 11	15.76 Oct. 24
\$19.17	\$19.17
19.17	19.17
\$22.00 Jan. 7	\$19.17 Apr. 10
21.83 Dec. 30	16.04 Apr. 9
22.50 Oct. 3	14.08 May 16
15.00 Nov. 22	11.00 June 7
21.92 Mar. 30	12.67 June 9
17.75 Dec. 21	12.67 June 8
13.42 Dec. 10	10.33 Apr. 29
13.00 Mar. 13	9.50 Sept. 25
12.25 Aug. 8	6.75 Jan. 3
8.50 Jan. 12	6.43 July 5
11.33 Jan. 6	8.50 Dec. 29
15.00 Feb. 18	11.25 Dec. 9
17.58 Jan. 29	14.08 Dec. 8

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

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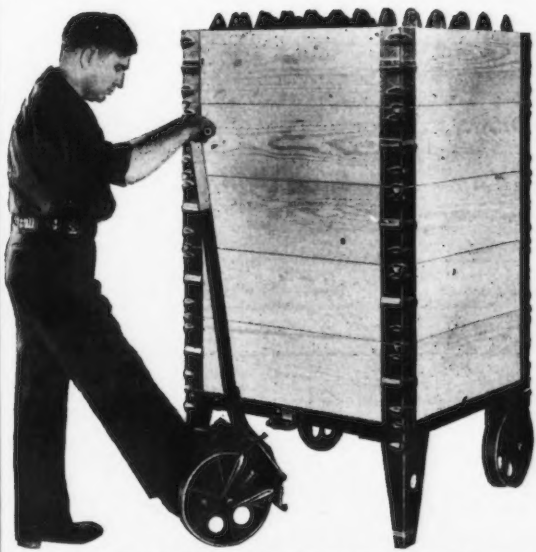
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THE TURNER SYSTEM OF MATERIALS HANDLING

**Cuts Costs by Putting Your Plant
in "Apple Pie" Order—
and KEEPING it that Way!**



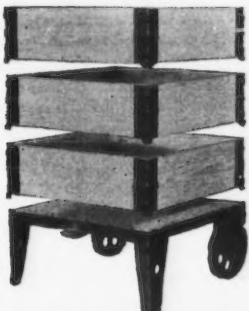
"DELIVER THE BIN AND SAVE THE HANDLING." The Transport is half truck, half platform. It has the advantages of both, the disadvantages of neither. Fitted with Bin Sections (Wooden-side or All-steel), Racks, Trays and Die Tables, it is moved by hand "Jimmy," power lift truck, crane or tractor.



Floor Plate Deck Transport provides point contact with hot materials. Other types have Wooden, Grid and Flat Steel Decks.

The first requisite to efficiency is putting things in order. That's elementary! Anyone with brain and brawn can put a plant in order. But let thousands of parts start to move — and look at it two days later!

The TURNER SYSTEM will *automatically* put your plant in order — but, far more important, it will *keep* it that way day in and day out. Why? Because it is a uniformly standardized system made up of interlocking, interchangeable units . . . scientifically engineered to co-ordinate almost every manufacturing operation. It is a permanent solution to your problem of shop organization.



Bins are always the RIGHT SIZE because Sections (above) are removed as load diminishes, added as load increases. Cuts labor costs in a big way.

THE TURNER SYSTEM HAS SAVED UP TO 50% IN LABOR, SPACE AND EQUIPMENT COSTS FOR OTHER MANUFACTURERS. FIND OUT WHAT IT CAN DO FOR YOU!

- Write Today for:
1. Descriptive Book on the Turner System.
 2. 60 Day Free Trial Offer.

EVERYTHING ON WHEELS AND READY TO GO

With the TURNER SYSTEM you have every Box, Bin, Shelf and Rack on the quickly movable Transport. Continuous plant re-arrangement is simple because all units are already on wheels.



Shelf Racks fit on movable Transports. Sections may be moved as required.

FACTORY SERVICE COMPANY
4621 NORTH TWENTY-FIRST STREET MILWAUKEE 9, WISCONSIN

Iron and Steel Prices...

Steel prices shown here are f.o.b. basing points in cents per pound or dollars per gross ton. Extras apply. Delivered prices do not reflect 3 pct tax on freight. Industry practice has discontinued arbitrary f.o.b. prices at Gulf and Pacific Ports. Space limitations prevent quotation of delivered prices at major ports. (1) Commercial quality sheet grade; primes, 25c above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. (8) Also shafting. For quantities of 20,000 lb to 39,999 lb. (9) Carload lot in manufacturing trade. (10) This base price for annealed, bright finish wire, commercial spring wire. (11) Boxed. (12) Produced to dimensional tolerances in AISI Manual Sec. 6. (13) Delivered San Francisco only: Includes 3 pct freight tax. (14) Delivered Kaiser Co. prices; includes 3 pct freight tax. (15) 0.035 to 0.075 in. thick by 3/4 to 3 1/2 in. wide. (16) Some producers are charging 2.75c.

Basing Points	Pitts- burgh	Chicago	Gary	Cleve- land	Bir- mingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	San Franc'co, Los Angeles, Seattle	DELIVERED TO		
												Detroit	New York	Phila- delphia
INGOTS														
Carbon, rerolling														
Carbon, forging	\$40.00	\$40.00	\$40.00	\$40.00	\$40.00	\$40.00	\$40.00							
Alloy	\$52.00											Canton=\$52.00)		
BILLETS, BLOOMS, SLABS														
Carbon, rerolling	\$42.00	\$42.00	\$42.00	\$42.00	\$42.00	\$42.00	\$42.00	\$42.00	\$42.00				\$45.00	
Carbon, forging billets	\$50.00	\$50.00	\$50.00	\$50.00	\$50.00	\$50.00	\$50.00	\$50.00					\$53.00	
Alloy	\$61.00	\$61.00				\$61.00							\$64.00	
SHEET BARS							\$50							
PIPE SKELP	2.35¢	2.35¢					2.35¢	2.35¢						
WIRE RODS	2.55¢	2.55¢		2.55¢	2.55¢							3.27¢ ¹³		
SHEETS														
Hot-rolled	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.875¢	2.50¢			2.65¢	2.79¢
Cold-rolled ¹	3.20¢	3.20¢	3.20¢	3.20¢		3.20¢	3.20¢		3.30¢				3.35¢	3.61¢
Galvanized (10 gage)	3.55¢	3.55¢	3.55¢		3.55¢		3.55¢	3.55¢	3.65¢					3.84¢
Enameling (12 gage)	3.55¢	3.55¢	3.55¢	3.55¢			3.55¢		3.65¢				3.70¢	3.95¢
Long ternes ² (10 gage)	3.55¢	3.55¢	3.55¢											3.91¢
STRIP														
Hot-rolled ³	2.50¢	2.50¢	2.50¢	2.50¢ ¹⁵	2.50¢		2.50¢						2.65¢	2.93¢
Cold-rolled ⁴	3.20¢	3.30¢		3.20¢			3.20¢						3.35¢	3.61¢
Cooperage stock	2.80¢	2.80¢			2.80¢		2.80¢							3.09¢
TINPLATE														
Standard cokes, base box	\$5.75	\$5.75	\$5.75		\$5.85			\$5.85	\$5.85				(Warren, Ohio=\$5.75)	\$6.157
Electro, box ^(0.25 lb. 0.50 lb. 0.75 lb.)														
BLACKPLATE														
29 gage ⁵	3.60¢	3.60¢	3.60¢		3.70¢			3.70¢	3.70¢				(Warren, Ohio=\$5.75)	3.99¢
TERNES, MFG.														
Special coated, base box														
BARS														
Carbon steel	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢					3.285¢	2.75¢	3.01¢
Rail steel ⁶ , ¹⁶	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢								
Reinforcing (billet) ⁷	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢				2.985¢	2.74¢	2.65¢
Reinforcing (rail) ⁷ , ¹⁶	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢							
Cold-finished ⁸	3.20¢	3.20¢	3.20¢	3.20¢		3.20¢							3.61¢	3.55¢
Alloy, hot-rolled	3.05¢	3.05¢				3.05¢	3.05¢					3.20¢		3.19¢
Alloy, cold-drawn	3.80¢	3.80¢	3.80¢	3.80¢		3.80¢						3.95¢		
PLATE														
Carbon steel ¹²	2.65¢	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢						2.87¢	2.85¢
Floor plates	3.90¢	3.90¢											4.30¢	4.28¢
Alloy	3.79¢	3.79¢											4.01¢	3.895¢
SHAPES														
Structural	2.50¢	2.50¢	2.50¢		2.50¢	2.50¢						3.41¢ ¹⁴	2.70¢	2.64¢
SPRING STEEL, C-R														
0.26 to 0.40 carbon	3.20¢			3.20¢										
0.41 to 0.60 carbon	4.70¢			4.70¢										
0.61 to 0.80 carbon	5.30¢			5.30¢										
0.81 to 1.00 carbon	6.80¢			6.80¢										
Over 1.00 carbon	9.10¢			9.10¢										
MANUFACTURERS' WIRE ⁹														
Bright ¹⁰	3.30¢	3.30¢		3.30¢	3.30¢							5.63¢ ¹³	3.71¢	3.38¢
Galvanized														
Spring (high carbon)	4.25¢	4.25¢		4.25¢								5.24¢ ¹³	4.66¢	4.345¢
PILING														
Steel sheet	3.00¢	3.00¢				3.00¢							3.41¢	3.36¢

PRICES

CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. basing point

Basing Point	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 448
Ingot, P'gh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila.	Subject to negotiation			Subject to negotiation		
Blooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt.	22.99	24.67	17.01	17.47	20.89	25.29
Slabs, P'gh, Chi, Canton, Balt, Phila, Reading	22.99	24.67	17.01	17.47	20.89	25.29
Billets, P'gh, Chi, Canton, Watervliet, Syracuse, Balt.	Subject to negotiation			Subject to negotiation		
Billets, forging, P'gh, Chi, Canton, Dunkirk, Balt, Phila, Reading, Water, Syracuse, Ft. Wayne, Titusville	23.00	22.50	17.50	17.50	21.00	25.50
Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville	27.50	26.00	20.50	21.00	24.50	30.00
Bars, c-f, P'gh, Chi, Cleve, Canton, Dunkirk, Syracuse, Balt, Phila, Reading, Ft. Wayne, Watervliet	27.50	26.00	20.50	21.00	24.50	30.00
Plates, P'gh, Middletown, Canton	31.50	29.50	23.50	24.00	28.00	33.00
Shapes, structural, P'gh, Chi	27.50	26.00	20.50	21.00	24.50	30.00
Sheets, P'gh, Chi, Middletown, Canton, Balt.	39.00	37.00	29.00	31.50	35.50	39.50
Strip, h-r, P'gh, Chi, Reading, Canton, Youngstown	25.50	23.50	18.50	19.00	23.00	28.00
Strip, c-r, P'gh, Cleve, Newark, N. J., Reading, Canton, Youngstown	32.50	30.50	24.00	24.50	28.50	33.50
Wire, c-d, Cleve, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J., Phila., Ft. Wayne	27.50	26.00	20.50	21.00	24.50	30.00
Wire, flat, c-r, Cleve, Balt, Reading, Dunkirk, Canton	32.48	30.30	23.80	24.34	28.52	33.28
Rod, h-r, Syracuse	27.05	25.87	20.02	20.56	24.34	29.75
Tubing, seamless, P'gh, Chi, Canton, (4 to 8 in.)	72.09	72.09	.....	68.49	.....	.....

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk. *Also Canton, O.)

An increase of 8.2 pct applies to base price and extras

	Base per lb
High speed	67¢
Straight molybdenum	54¢
Tungsten-molybdenum	57 1/2¢
High-carbon-chromium*	43¢
Oil hardening*	24¢
Special carbon*	22¢
Extra carbon*	18¢
Regular carbon*	14¢

Warehouse prices on and east of Mississippi are 2¢ per lb higher; west of Mississippi 3¢ higher.

ELECTRICAL SHEETS

Base, all grades f.o.b. Pittsburgh

	Per lb
Field grade	4.20¢
Armature	4.50¢
Electrical	5.00¢
Motor	5.70¢
Dynamo	6.45¢
Transformer 72	6.95¢
Transformer 65	7.65¢
Transformer 58	8.35¢
Transformer 52	9.15¢

F.o.b. Chicago and Gary, field grade through motor; f.o.b. Granite City, add 10¢ per 100 lb on field grade to and including dynamo.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, heavier than 60 lb	
No. 1 O.H., per 100 lb	\$2.50
Angle splice bars, 100 lb	3.00
(F.o.b. basing points)	
Light rails (from billets)	per 100 lb \$2.85
Light rails (from rail steel), f.o.b. Williamsport, Pa.	2.95

	Base per lb
Cut spikes	4.50¢
Screw spikes	6.40¢
Tie plate, steel	2.80¢
Tie plates, Pacific Coast	2.95¢
Track bolts	6.50¢
Track bolts, heat treated, to rail roads	6.75¢
Track bolts, jobbers discount	63-5

Basing points, light rails, Pittsburgh, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Welton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, add 25¢.

ROOFING TERNEPLATE

(F.o.b. Pittsburgh, 112 sheets)

20x14 in. 20x28 in.

8-lb coating I.C....	\$6.75	\$13.50
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CLAD STEEL

Base prices, cents per pound

	Plate	Sheet
Stainless-clad		
No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Coatesville, Pa.	24.00*	22.00
Nickel-clad		
10 pct, f.o.b. Coatesville, Pa.	21.50	.....
Inconel-clad		
10 pct, f.o.b. Coatesville..	30.00	.....
Monel-clad		
10 pct, f.o.b. Coatesville..	29.00	.....
Aluminized steel		
Hot dip, 20 gage, f.o.b. Pittsburgh	.....	9.00

*Includes annealing and pickling.

MERCHANT WIRE PRODUCTS

To the dealer f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

Base Delivered per San Francisco

Standard, galvanized and coated nails	\$3.75†	\$4.83
Cut nails, carloads, Pittsburgh base	5.30	.....

†10¢ additional at Cleveland, 30¢ at Worcester.

	Base per 100 lb	
Annealed fence wire	\$3.95†	\$4.96
Annealed galv. fence wire	4.40†	5.41

†10¢ additional at Worcester.

To the dealer f.o.b. Pittsburgh, Chicago, Birmingham

	Base column
Woven wire fence*	84 107
Fence posts, carloads	82††
Single loop bale ties	86 110
Galvanized barbed wire**	94 114
Twisted barbed wire	94

* 15 1/2 gage and heavier. ** On 80-rod spools in carload quantities. †† Pittsburgh; Duluth 90.

HIGH STRENGTH, LOW ALLOY STEELS

base prices, cents per pound

Steel	Aldcor	Corten	Double Strength No. 1	Dynalloy	Hi Steel	Mayari R	Otiscoloy	Yoloy	Y-50	NAX High Tensile
Producer	Repub-lic	Carnegie-Illinois, Republic	Repub-lic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	American Rolling Mill	Great Lakes Steel
Plates.....	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	.....	4.10
Sheets										
Hot-rolled...	3.85	3.85	3.85	3.85	3.85	3.85	3.85	3.85	.....	3.75
Cold-rolled...	4.75	4.75	4.75	.....	4.75	4.75	4.75	4.75	5.225*	4.55
Galvanized...	.....	5.40	.....	.....	.....	5.40	.....	.....	.....	.....
Strip										
Hot-rolled...	3.85	3.85	3.85	.....	3.85	3.85	3.85	3.85	.....	3.75
Cold-rolled...	.....	.....	4.75	.....	.....	4.75	4.75	4.75	5.00*	4.55†
Shapes.....	.....	3.85	.....	.....	3.85	3.85	3.85	3.85	.....	.....
Beams.....	.....	3.85	.....	.....	.....	3.85	.....	.....	.....	.....
Bars										
Hot-rolled...	4.00	4.00	4.00	.....	.....	4.00	4.00	4.00	.....	4.00
Cold-rolled...	.....	.....	.....	.....	.....	.....	.....	4.60	.....	.....
Bar shapes.....	.....	4.00	.....	.....	4.00	4.00	4.00	4.00	.....	.....

* 21 gage and lighter. † Pittsburgh, add 0.10¢ at Chicago and Gary.

PRICES

PIPE AND TUBING

Base discounts. F.o.b. Pittsburgh and Lorain, steel butt weld and seamless. Others f.o.b. Pittsburgh only

Base price, \$200.00 per net ton

Standard, threaded & coupled

Steel, butt weld	Black	Galv.
1/2-in.	55 1/2	41
3/4-in.	58 1/2	45
1 to 3-in.	60 1/2	47 1/2
Wrought Iron, butt weld		
1/2-in.	2	+20
3/4-in.	11 1/2	+10
1 and 1 1/2-in.	17	+2
1 1/2-in.	22 1/2	+1 1/2
2-in.	23	2
Steel, lap weld		
2-in.	53	39 1/2
2 1/2 and 3-in.	56	42 1/2
3 1/2 to 6-in.	58	44 1/2
Steel, seamless		
2-in.	52	38 1/2
2 1/2 and 3-in.	55	41 1/2
3 1/2 to 6-in.	57	43 1/2
Wrought Iron, lap weld		
2-in.	14 1/2	+5 1/2
2 1/2 to 3 1/2-in.	17	+1 1/2
4-in.	21	4
4 1/2 to 8-in.	19	2 1/2

Extra Strong, plain ends

Steel, butt weld		
1/2-in.	54 1/2	41 1/2
3/4-in.	58 1/2	45 1/2
1 to 3-in.	60	48
Wrought Iron, butt weld		
1/2-in.	6 1/2	+14
3/4-in.	12 1/2	+8
1 to 2-in.	22	2
Steel, lap weld		
2-in.	52	39 1/2
2 1/2 and 3-in.	56	42 1/2
3 1/2 to 6-in.	59 1/2	47
Steel, seamless		
2-in.	51	38 1/2
2 1/2 and 3-in.	55	42 1/2
3 1/2 to 6-in.	58 1/2	46
Wrought Iron, lap weld		
2-in.	17 1/2	+2
2 1/2 to 4-in.	26	8 1/2
4 1/2 to 6-in.	22	4

Basing discounts for standard pipe are for threads and couplings. For threads only, butt weld, lap weld and seamless pipe, one point higher discount (lower price) applies. For plain ends, butt weld, lap weld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lap weld and seamless 3 1/2-in. and larger four points higher discount (lower price) applies. F.o.b. Gary prices are one point lower discount on all butt weld. On butt weld and lap weld steel pipe, jobbers are granted a discount of 5 pct. On L.C.I. shipments, prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft, f.o.b. Pittsburgh in carload lots, cut length 4 to 24 ft, inclusive.

O.D. Gage	Hot- Rolled	Cold- Drawn	Electric Weld Hot- Rolled	Electric Weld Cold- Drawn
2 1/2	13	\$15.29	\$18.17	\$15.00
3	12	20.57	24.43	20.11
3 1/2	12	22.87	27.18	22.26
4	11	28.86	34.30	28.06
4 1/2	10	35.82	42.55	34.78

CAST IRON WATER PIPE

	Per net ton
6-in. to 24-in. del'd Chicago	\$81.56
6-in. to 24-in. del'd New York	79.80
6-in. to 24-in., Birmingham	71.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles for all rail shipment; rail and water shipment less	95.00
Class "A" and gas pipe, \$5 extra; 4-in. pipe is \$5 a ton above 6-in.	

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

Base discount less case lots

	Percent Off List
1/2 in. & smaller x 6 in. & shorter	55
3/16 & 1/2 in. x 6 in. & shorter	52
1/2 in. x 6 in. & shorter	49
1 1/2 in. and larger, all lengths	48
Lag, all diam over 6 in. long	43
Lag, all diam x 6 in. & shorter	50
Flow bolts	57

Nuts, Cold Punched or Hot Pressed (Hexagon or Square)

1/2 in. and smaller	48
3/16 to 1 in. inclusive	47
1 1/2 to 1 1/2 in. inclusive	45
1 1/2 in. and larger	44

On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts U.S.S. S.A.E.

Base discount less case lots

7/16 in. and smaller	51
1/2 in. and smaller	48
1/2 in. through 1 in.	48
3/16 in. through 1 in.	47
1 1/2 in. through 1 1/2 in.	45
1 1/2 in. and larger	44

In full case lots, 15 pct additional discount. For 200 lb or more, freight allowed up to 50¢ per 100 lb, based on Cleveland, Chicago, Pittsburgh.

Stove Bolts

	Consumer
Packages, nuts separate	60 and 10
In bulk	74

On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.

Large Rivets

	Base per 100 Lb
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	\$5.25
F.o.b. Lebanon, Pa.	5.40

Small Rivets

	Percent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	55 and 5

Cap and Set Screws

	Percent Off List
Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	56
Set screws, cup and oval points	61
Milled studs	33
Flat head cap screws, listed sizes	21
Fillister head cap, listed sizes	40

Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.

FLUORSPAR

Maximum price f.o.b. consumer's plant, \$30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

	Base price per short ton
Effective CaF ₂ Content:	
70% or more	\$33.00
65% but less than 70%	32.00
60% but less than 65%	31.00
Less than 60%	30.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

	Per Gross Ton
Old range, bessemer	\$5.95
Old range, non-bessemer	5.80
Mesabi, bessemer	5.70
Mesabi, non-bessemer	5.55
High phosphorus	5.55

Prices quoted retroactive to Jan. 1, 1947.

METAL POWDERS

Prices in cents per pound in ton lots, f.o.b. shipping point.

Brass, minus 100 mesh	23¢ to 27¢
Copper, electrolytic, 100 and 325 mesh	30¢ to 31 1/2¢
Copper, reduced, 150 and 200 mesh	29¢ to 30 1/2¢
Iron, commercial, 100, 200, 325, mesh 96 + % Fe	11¢ to 16¢
Swedish sponge iron, 100 mesh, c.i.f. N. Y., carlots, ocean bags	7.4¢ to 8¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots	5¢
Iron, hydrogen reduced, 300 mesh and finer, 98 + % Fe, drum lots	66¢
Iron, electrolytic, unannealed, 325 mesh and coarser, 99 + % Fe, 25¢ to 31¢	
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe	17¢
Iron carbonyl, 300 mesh and finer, 98-99.3 + % Fe	90¢ to \$1.75
Aluminum, 100, 200 mesh, carlots	23¢ to 26¢
Antimony, 100 mesh	36.05¢
Cadmium, 100 mesh	\$2.00
Chromium, 100 mesh and finer	\$1.025
Lead, 100, 200 & 300 mesh, 18.5¢ to 23.5¢	
Manganese, minus 325 mesh and coarser	33¢
Nickel, 150 mesh	51 1/2¢
Silicon, 100 mesh	18.15¢
Solder powder, 100 mesh, 8 1/2¢ plus metal	
Tin, 100 mesh	76.75¢
Tungsten metal powder, 98%	
99%, any quantity, per lb.	\$2.80
Molybdenum powder, 99%, in 100-lb kegs, f.o.b. York, Pa., per lb.	\$2.65
Under 100 lb	\$2.90

COKE

	Net Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	\$8.75 to \$9.25
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	10.00 to 10.50

	Base per 100 Lb
Chicago, del'd	\$16.10
Chicago, f.o.b.	15.10
New England, del'd	16.04
Seaboard, Kearney, N. J., f.o.b.	15.35
Philadelphia, del'd	15.40
Buffalo, del'd	16.14
Ashland, Ohio, f.o.b.	13.35
Painesville, Ohio, f.o.b.	14.60
Erie, del'd	15.75
Cleveland, del'd	15.90
Cincinnati, del'd	15.39
St. Louis, del'd	15.85
Birmingham, del'd	12.35

REFRACTORIES

(F.o.b. Works)

	Carloads, Per 1000
First quality, Ohio	\$57.00
First quality, Pa., Md., Ky., Mo.	65.00
First quality, New Jersey	70.00
Sec. quality, Pa., Md., Ky., Mo.	59.00
Sec. quality, New Jersey	62.00
Sec. quality, Ohio	51.00
Ground fire clay, net ton, bulk	9.50

Silica Brick

	Per Net Ton
Pennsylvania and Birmingham	\$65.00
Chicago District	74.00
Silica cement, net ton (Eastern)	11.50
Chicago	12.50

Chrome Brick

	Per Net Ton
Standard chemically bonded, Balt., Plymouth Meeting, Chester	\$59.00

Magnesite Brick

	Per Net Ton
Standard, Balt. and Chester	\$81.00
Chemically bonded, Baltimore	70.00

Grain Magnesite

	Per Net Ton
Domestic, f.o.b. Balt. and Chester in sacks	\$44.50
Domestic, f.o.b. Chewelah, Wash., in bulk	24.00
in sacks	28.00
Clinker (dead burned) dolomite, bulk, per net ton, f.o.b. York, Pa.	10.05
Midwest, add 10¢; Mo. Valley, add 20¢	

PRICES

WAREHOUSE PRICES

Base prices, delivered metropolitan areas, per 100 lb.

CITIES	SHEETS			STRIP		Plates	Standard Structural Shapes	BARS		ALLOY BARS			
	Hot-Rolled (10 gage)	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled			Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Philadelphia.....	\$4.24	\$5.18	\$5.29	\$4.43	\$5.28	\$4.54	\$4.22	\$4.48	\$5.38	\$8.37	\$8.37	\$9.88	\$9.88
New York.....	4.42	5.17 ¹	5.47	4.62	5.40	4.72	4.37	4.62	5.42	8.42	8.42	9.92	9.92
Boston.....	4.50	5.12 ¹²	5.55 ¹²	4.65	5.356	4.80	4.47	4.62	5.468	8.62	8.62	9.97	9.97
Baltimore.....	4.09	.....	5.14	4.40	.....	4.39	4.34	4.45	5.35	.....	.....	.....	.....
Norfolk.....	4.35	.....	.....	.....	.....	4.50	4.50	4.75	5.50	.....	.....	.....	.....
Chicago.....	.....	.....	.....	.....	5.90	.....	.....	.....	4.95	8.10	8.10	9.35	9.35
Milwaukee.....	.....	.....	.....	.....	.....	.....	.....	.....	5.149	.....	.....	.....	.....
Cleveland.....	4.00	4.60	5.238	4.188	4.95	4.30 [†]	4.311	4.05	4.95	8.358	8.358	9.35	9.35
Buffalo.....	4.00	4.60	5.35	4.30	5.25	4.65	4.05	4.05	4.95	8.10	8.10	9.35	9.35
Detroit.....	4.15	4.75	5.42	4.34	5.24	4.59 [†]	4.42	4.20	5.12	8.51	8.51	9.74	9.74
Cincinnati.....	4.116	4.716	5.166	.....	.....	4.803	4.444	4.403	5.303	.....	.....	.....	.....
St. Louis.....	4.199	4.799	5.424	4.199	5.424	4.499	4.249	4.249	5.324	8.574	8.574	9.824	9.824
Pittsburgh.....	4.00	4.60 ¹	.....	4.00	.....	4.30	4.05	4.05	4.95	8.10	8.10	9.35	9.35
St. Paul.....	4.384 ⁷	5.034 ¹	5.434 ²	4.404 ⁷	.....	4.684 ⁷	4.434 ⁷	4.434 ⁷	5.726 ⁶	.....	10.084 ⁶	.....	11.726 ⁶
Duluth.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Omaha.....	4.868	6.618 ¹	5.918	4.868	.....	5.168	4.918	4.918	5.818	.....	.....	.....	.....
Indianapolis.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Birmingham.....	3.85	.....	5.20	4.00	.....	4.30	4.05	4.05	5.83	.....	.....	.....	.....
Memphis.....	4.47	.....	5.97	4.72	.....	4.92	4.67	4.67	5.78	.....	.....	.....	.....
New Orleans.....	*4.46 ¹¹	5.77 ¹	.....	.....	.....	4.83 ¹¹	*4.68 ¹¹	*4.78 ¹¹	6.14	.....	.....	.....	.....
Los Angeles.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
San Francisco.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Seattle.....	5.00	7.80	6.30	5.30 ⁴	.....	5.25 ⁴	4.95 ⁴	5.00 ⁴	7.10	.....	.....	.....	.....
Portland.....	5.00 ³	.....	6.25 ³	5.50 ³	.....	5.40 ³	5.10 ³	5.10 ³	7.20	.....	9.30	.....	.....
Salt Lake City.....	6.25	.....	7.71	6.50	.....	6.10	6.25	6.25	7.50 ¹⁰	.....	.....	.....	.....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1999 lb;

strip, extras on all quantities; bars 1000 lb and over.

ALLOY BARS: 1000 lb and over.

GALVANIZED SHEETS: 450 to 1499 lb.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 10,000 lb; (5) 2000 lb and over; (6) 1000 lb

and over; (7) 400 to 14,999; (8) 400 lb and over; (9) 450 to 1499; (10) 500 to 999; (11) 400 to 3999; (12) 450 to 3749.

* Add 46¢ for sizes not rolled in Birmingham.

† Up to ¾ in. thick and 90 in. wide.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums.

BASING POINT PRICES						DELIVERED PRICES (BASE GRADES)							
Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem.....	34.00	34.50	35.00	35.50	.....	Boston.....	Everett.....	\$0.50 Arb.	29.50	30.00	30.50	31.00	.....
Birdsboro.....	34.00	34.50	35.00	35.50	39.00	Boston.....	Birdsboro-Steeltown.....	4.82	.....	.....	.....	.....	43.82
Birmingham.....	29.38	29.88	.....	.....	.....	Brooklyn.....	Bethlehem.....	3.00	37.00	37.50	38.00	38.50	.....
Buffalo.....	32.50	33.00	33.50	.....	.....	Brooklyn.....	Birdsboro.....	3.50	.....	.....	.....	.....	42.50
Canton.....	32.50	33.00	33.50	.....	.....	Cincinnati.....	Birmingham.....	4.87	34.25	34.75	.....	.....	.....
Chicago.....	32.50	33.00	33.50	34.00	.....	Jersey City.....	Bethlehem.....	1.84	35.84	36.34	36.84	37.34	.....
Cleveland.....	32.50	33.00	33.50	.....	.....	Los Angeles.....	Birdsboro.....	2.33	.....	.....	.....	.....	41.33
Duluth.....	33.00	33.50	34.00	34.50	.....	Provo.....	Provo.....	5.94	38.94	39.44	.....	.....	.....
Erie.....	32.50	33.00	33.50	34.00	.....	Mansfield.....	Cleveland-Toledo.....	2.33	34.83	35.33	35.83	36.33	.....
Everett.....	29.00	29.50	30.00	30.50	.....	Philadelphia.....	Swedeiland.....	1.01	36.01	36.51	37.01	37.51	.....
Granite City.....	32.50	33.00	33.50	.....	.....	Philadelphia.....	Birdsboro.....	1.49	.....	.....	.....	.....	40.49
Masillon.....	32.50	33.00	33.50	.....	.....	San Francisco.....	Provo.....	5.94	38.94	39.44	.....	.....	.....
Newell Island.....	33.00	33.50	33.50	34.00	.....	Seattle.....	Provo.....	5.94	39.44	39.44	.....	.....	.....
Provo.....	33.00	33.50	.....	.....	.....	St. Louis.....	Granite City.....	0.75 Arb.	33.25	34.25	34.25	.....	.....
Sharpsville.....	33.00	33.50	33.50	34.00	.....	.....	.....	.....	.....	.....	.....	.....	.....
Steeltown.....	34.00	.....	.....	.....	39.00	.....	.....	.....	.....	.....	.....	.....	.....
Swedeiland.....	37.50	35.50	36.00	36.50	.....	.....	.....	.....	.....	.....	.....	.....	.....
Toledo.....	32.50	33.00	33.50	34.00	.....	.....	.....	.....	.....	.....	.....	.....	.....
Troy, N. Y.....	34.00	34.50	35.00	35.50	39.00	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown.....	32.50	33.00	33.00	33.50	.....	.....	.....	.....	.....	.....	.....	.....	.....

(1) Struthers Iron & Steel Co., Struthers, Ohio, charges 50¢ per ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Charcoal pig iron base price for low phosphorous \$40.50 per gross ton, f.o.b. Lyles, Tenn. Delivered to Chicago, \$45.99. High phosphorous charcoal pig iron is not being produced.

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. \$2 per ton extra may be charged for 0.5

to 0.75 pct nickel content and \$1 per ton extra for each additional 0.25 pct nickel.

Silvery iron silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio—\$40.50; f.o.b. Buffalo—\$41.75. Add \$1.00 per ton for each additional 0.50 pct Si, up to 12 pct. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add \$1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are \$1.00 per ton above silvery iron prices of comparable analysis.

FERROALLOY PRICES

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size, f.o.b. Baltimore, Philadelphia, New York, Birmingham, Rockwood, Tenn.

Carload lots (bulk)	\$135.00
Less ton lots (packed)	143.50
F.o.b. Pittsburgh	139.50

\$1.70 for each 1% above 82% Mn; penalty, \$1.70 for each 1% below 78%.

Briquets—cents per pound of briquet, freight allowed, 66% contained Mn.

	Eastern	Central	Western
Carload, bulk	6.40	6.65	7.20
Ton lots	7.30	7.90	9.80
Less ton lots	7.70	8.30	10.20

Spiegeleisen

Contract prices, gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn	19-21% Mn
Carloads	\$43.00	\$44.00
F.o.b. Pittsburgh	44.00	44.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, f.o.b. shipping point, freight allowed, eastern zone.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk	30
L.c.l. lots	32

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	32
Ton lots	34
Less ton lots	36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, f.o.b. shipping point, freight allowed, eastern zone.

	Carloads	Ton	Less
0.10% max. C, 0.06% P, 90% Mn	21.00	21.40	21.65
0.10% max. C	20.50	20.90	21.15
0.15% max. C	20.00	20.40	20.65
0.30% max. C	19.50	19.90	20.15
0.50% max. C	19.00	19.40	19.65
0.75% max. C			
7.00% max. Si	16.00	16.40	16.65

Silicomanganese

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed, 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk	6.45
Ton lots	7.40
Briquet, contract basis, carlots, bulk freight allowed, per lb of briquet	6.15
Ton lots	7.05
Less ton lots	7.45

Silvery Iron (electric furnace)

Si 14.01 to 14.50%, \$56.00 f.o.b. Keokuk, Iowa; \$52.75 f.o.b. Jackson, Ohio; \$54.00 f.o.b. Niagara Falls. Add \$1.00 per ton for each additional 0.50% Si up to and including 18%. Add \$1.00 per ton for low impurities, not to exceed: P—0.05%, S—0.04%, C—1.00%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots packed.

	Eastern	Central	Western
96% Si, 2% Fe	14.65	16.90	18.65
97% Si, 1% Fe	15.05	17.30	19.05

Ferrosilicon Briquets

Contract price, cents per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination, 40% Si, 1 lb briquets.

	Eastern	Central	Western
Carload, bulk	3.85	4.10	4.30
Ton lots	4.75	5.35	5.65
Less ton lots	5.15	5.75	6.05

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
25% Si	11.65	7.95	8.15
50% Si	7.45	7.95	8.15
75% Si	9.25	9.55	10.30
80-90% Si	10.45	10.75	11.50
90-95% Si	12.05	12.35	13.05

Ferrochrome (65-72% Cr, 2% max. Si)

Contract prices, cents per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
0.06% C	23.00	23.40	24.00
0.10% C	22.50	22.90	23.50
0.15% C	22.00	22.40	23.00
0.20% C	21.50	21.90	22.50
0.50% C	21.00	21.40	22.00
1.00% C	20.50	20.90	21.50
2.00% C	19.50	19.90	20.50
65-69% Cr, 4-9% C	15.60	16.00	16.15
62-66% Cr, 4-6% C	16.60	17.00	17.15
6-9% Si	16.60	17.00	17.15

Briquets—contract price, cents per pound of briquet, f.o.b. shipping point, freight allowed, 60% chromium.

	Eastern	Central	Western
Carload, bulk	9.85	10.10	10.20
Ton lots	10.75	11.65	12.25
Less ton lots	11.15	12.05	12.65

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, f.o.b. shipping point, freight allowed.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

	Eastern	Central	Western
Carload	16.70	17.10	17.25
Ton lots	17.90	19.20	20.00
Less ton lots	18.60	19.90	20.70

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

	Eastern	Central	Western
Carload	20.00	20.40	21.00
Ton lots	21.00	21.65	22.35
Less ton lots	22.00	22.65	23.35

Chromium Metal

Contract prices, cents per lb, chromium contained, carload, f.o.b. shipping point, freight allowed, 97% min. Cr, 1% max. Fe.

	Eastern	Central	Western
0.20% max. C	83.50	85.00	86.25
0.50% max. C	79.50	81.00	82.25
9.00% min. C	79.50	81.00	82.25

Calcium—Silicon

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed.

30-35% Ca, 60-65% Si, 3.00% max. Fe or 23-32% Ca, 60.65% Si, 6.00% max. Fe.

	Eastern	Central	Western
Carloads	13.00	13.50	15.55
Ton lots	14.50	15.25	17.40
Less ton lots	15.50	16.25	18.40

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, f.o.b. shipping point, freight allowed.

16-20% Ca, 14-18% Mn, 53-59% Si.

	Eastern	Central	Western
Carloads	15.50	16.00	18.05
Ton lots	16.50	17.35	19.10
Less ton lots	17.00	17.85	19.60

Calcium Metal

Eastern zone contract prices, cents per pound of metal, f.o.b. shipping point, freight allowed. Add 1.5¢ for central zone; 3.5¢ for western zone.

	Cast	Turnings	Distilled
Ton lots	\$1.60	\$2.35	\$2.95
Less ton lots	1.95	2.70	3.75

CMSZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

	Eastern	Central	Western
Ton lots	13.50	14.60	16.55
Less ton lots	14.25	15.35	17.30

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

	Eastern	Central	Western
Ton lots	13.25	14.35	16.30
Less ton lots	14.00	15.10	17.05

SMZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe.

	Eastern	Central	Western
Ton lots	13.25	14.35	16.30
Less ton lots	14.00	15.10	17.05

Other Ferroalloys

Ferrotungsten, standard, lump or 1/4 x down, packed, f.o.b. plant Niagara Falls, Washington, Pa., York, Pa., per pound contained T, 5 ton lots, freight allowed... \$2.08

Ferrovandium, 35-55%, contract basis, f.o.b. plant, freight allowances, per pound contained V.

Openhearth \$2.70

Crucible \$2.80

High speed steel (Primos) .. \$2.90

Vanadium pentoxide, 88-92% V₂O₅ technical grade, contract basis, per pound contained V₂O₅ \$1.10

Ferrocolumbium, 50-60%, contract basis, f.o.b. plant, freight allowed, per pound contained Cb

Ton lots \$2.50

Less ton lots \$2.55

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo 95¢

Calcium molybdate, 40-45%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo 80¢

Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per pound contained Mo 80¢

Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo 80¢

Ferrotitanium, 40-45%, 0.10% C max., f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti \$1.23

Less ton lots \$1.25

Ferrotitanium, 20-25%, 0.10% C max., ton lots, per pound contained Ti \$1.35

Less ton lots \$1.40

High carbon ferrotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads, per net ton... \$142.50

Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. (Siglo) Tenn., \$3 unitage per gross ton \$65.00

Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy

Carload, lots 14.50¢

Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight allowed, per pound of alloy

Carload, bulk 4.85¢

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Niagara Falls, carload 6.25¢

Ton lots 6.75¢

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound

Car lots 8.50¢

Ton lots 9.25¢

Boron Agents

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed.

Ferroboration, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

	Eastern	Central	Western
Less ton lots	\$1.30	\$1.3075	\$1.329

Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

	Ton lots	1.89	1.903	1.935
Less ton lots	2.01	2.023	2.065	

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

Less ton lots... \$2.10 \$2.1125 \$2.1445

Silicaz, contract basis, f.o.b. plant freight allowed, per pound.

Carload lots 35¢

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 50 lb and over.

No. 1 87.5¢

No. 6 60¢

No. 79 45¢

Bortram, f.o.b. Niagara Falls

Ton lots, per pound 45¢

Less ton lots, per pound 50¢

Carbortram, f.o.b. Suspension Bridge, N.Y., freight allowed, Ti 15-17%, B 0.90-1.15%, Si 2.5-3.0%, Al 1.0-2.0%.

Ton lots, per pound 8.0¢

Survey Shows Shippers In Chicago Not Getting Adequate Car Supply

Chicago

••• From a special survey conducted by A. H. Schwieter, traffic director, Chicago Assn. of Commerce and Industry, of 400 shippers in various industries in the Chicago metropolitan district, it has been found that at least one-half of the shippers are not getting an adequate supply of railroad cars to meet their daily requirements. The shortages range from 10 to 60 pct of requirements and practically all shippers are encountering delays in transit time of freight. The group questioned accounts for approximately 85 pct of the freight traffic moving in and out of the district and although there is an insufficient supply of cars of all types, the most critical shortage is in box cars.

The shortage to date would have been worse had not industry been able to utilize storage facilities. As of February the storage facilities are rapidly being exhausted so that the freight car bottleneck will continue to get worse in the months to come. Almost without exception the reporting companies said that they were maintaining their loading and unloading operations on a 6 day a week basis to help the railroads get the maximum use from their rolling stock and also to prevent embargoes being enforced for undue delay at their own docks.

An analysis of the detailed replies to the survey indicated that there were unusual delays in transit of both inbound and outbound freight. On the average, transit time is twice as long at present as it was during the war. Terminal switching time seems to be one of the critical points whether it be connecting or single line movements. Shippers also report that 5 to 10 pct of the cars received are not fit for the purpose intended and must be rejected.

The latest report on merchandise cars which cover all l.c.l. movements out of the Chicago area is for the month of January and covers a total of 23,000 outbound cars. This report, which is also made up by the Chicago Assn. of Commerce & Industry, shows that 53.7 pct of outbound

cars were moved on time. The cars that were late in being moved from the loading dock showed that 25.9 pct were 1 day late, 10.3 pct were 2 days late, 5 pct were 3 days late, 2.4 pct were 4 days late, and 2.7 pct were 5 days late or over. The data used in this survey were obtained from operating records and on following the movements through to destination it was found that 5.2 pct were delayed at that point due to failure to place for unloading.

Although turnaround time has not been broken down into the component phases, qualified observers here state that the longest delays are being experienced at terminal switching points or classification yards. Shippers in the West receiving goods from the East report that movements take more time to get through the Chicago switching area than the total road haul time from the eastern point of origin to the western destination. Class A box cars and gondola cars continue to be the most critical and traffic men in this area see no immediate relief in the situation.

CPA Reports Outlook Optimistic for High Economy During 1947

Washington

••• A qualified optimism regarding the continued economic good health of the United States during the coming year marks a special report on "The Production Outlook for 1947," released recently by Maj. Gen. Philip B. Fleming, Administrator of the Office of Temporary Controls and John C. Houston, Jr., Commissioner of Civilian Production.


If present tendencies continue, the report says, the value of gross national production should reach a total of \$202 billion during 1947.

Expectations are that (1) wage rates will rise somewhat in the spring of 1947; (2) prices of agricultural products will decline; (3) there will be an increase in building activity and in the output of consumer durable goods, particularly automobiles, for at least a good part of the year, and (4) the present high level of expenditures

(CONTINUED ON PAGE 148)

THOMAS

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can be done with these up-to-the minute presses. They combine modern structural design with the usual Thomas inbuilt ruggedness and dependability. Wide range of sizes and capacities. Write for Bulletin 307.

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OIL TRANSPORT
(Before Steel)

PAINTED FOR JONES & LAUGHLIN STEEL CORPORATION BY ORISON MACPHERSON



LAYING STEEL PIPE LINE

TRANSPORT OF PETROLEUM TO SERVE YOU WOULD BE WASTEFUL, SLOW, COSTLY—WITHOUT STEEL

Without steel, the petroleum that serves you in so many ways would still come out of the fields in wooden barrels. Transport would depend upon wagons, or flatcars with big wooden tubs. It might have to resort again to artificial floods, such as were operated during the "Oil Excitement" in Pennsylvania to sweep loaded flatboats down Oil Creek into the Allegheny and on to Pittsburgh. Lives were lost, great quantities of priceless petroleum were wasted when flimsy craft were wrecked in this frenzied rush to markets.

With steel, petroleum and its products and natural gas are transported to distant markets swiftly, inexpensively and without waste in pipe line systems that criss-cross the country. Thousands of miles of them are line pipe manufactured by Jones & Laughlin Steel Corporation of Controlled Quality Steel. Other J&L steels are components of tank cars and trucks, tank ships and barges.

Tomorrow, steel and petroleum research will develop still stronger, tougher steels. With these the oil and gas industries will achieve still better transportation for their many products so vitally essential to our mechanized civilization.

JONES & LAUGHLIN STEEL CORPORATION PITTSBURGH

SALES OFFICES: Atlanta • Baltimore • Boston • Buffalo
Chicago • Cincinnati • Cleveland • Columbus • Dallas
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Haven • New Orleans • New York • N. Kansas City
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South Bend • Syracuse • Toledo • Tulsa • Washington

CONTROLLED QUALITY STEELS



PIPE LINES

"Without the pipe line," says the story of 85 years of the oil business published in 1944 by the American Petroleum Institute, "oil literally would have backed up into the wells for lack of outlet, and the needs of modern civilization been left unsatisfied."

5 million barrels of crude oil are handled every day by pipe line systems in U. S.

A pipe line *pousse-café* is development of petroleum research, whereby 14 different petroleum products today may be transported at same time in same pipe line without mixing, as in making a *pousse-café*, gay 90's colorful tippie of liqueurs in layers of different specific gravities.

1st successful pipe line was laid in 1862 by Barrows & Co. to transport oil from Tarr Farm (Oil Creek) to nearby refinery.

"Pond freshets," (artificial floods) were operated in Oil Creek, before pipe lines were laid, to float boats to market loaded with oil in barrels and in bulk. Sawmill dams were opened, often twice a week, causing a quick rise in the stream. Waiting boatmen then cast off and went whirling down Oil Creek in their frail craft, watched by excited crowds. Jams often occurred. Boats were dashed to pieces against each other or bridge piers or dams. Men were drowned or crushed.

Entire cargo of a flatboat fleet of the 60's could be carried in one of today's 10,000-barrel steel petroleum barges operating on Ohio-Mississippi river system.

Disaster often hit oil fleets on voyage to Pittsburgh. An ice gorge in 1862 crashed into 350 boats with 60,000 barrels of oil aboard, crushing half of them, spilling the oil. Loss was over \$350,000. Fire broke out in one fleet, which tore loose and bridged the Allegheny with flames. One barge drifted to Franklin, Pa., burned wooden bridge there.

6,000 teams were engaged in oil hauling along Oil Creek in 1860. In one day 2,000 wagons passed through Titusville, Pa.

Actual photos of "pond freshets" in action on Oil Creek, found by Dr. Paul H. Giddens, curator of Drake Well Memorial Park, Titusville, Pa., among families of old-timers in the oil fields, were loaned to artist Orison MacPherson for guidance in painting "Oil Transport" on opposite page.

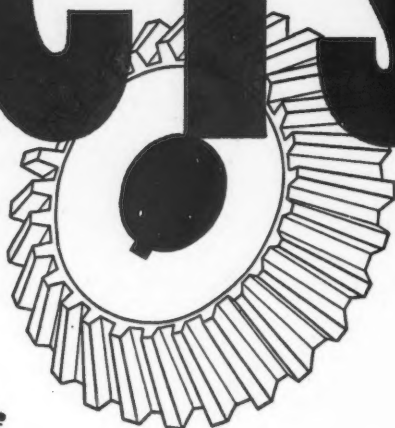
For free print of "Oil Transport," write Publicity Manager, Jones & Laughlin Steel Corporation, Pittsburgh 30, Pa.

Tank trucks and cars of J&L Otiscoloy steel weigh less, carry more, last longer.

First "tank" cars were merely wooden flatcars equipped with 40-gal. wooden tubs.

For a free copy of J&L book, "Tubular Products for the Oil Industry," write nearest District Sales office listed at left, or Publicity Manager, Jones & Laughlin Steel Corporation, Pittsburgh 30, Pa.

FACTS



For Buyers of

PRECISION GEARS

We manufacture precision gears to customers' specifications. Our production equipment comprises modern machine tools and our facilities are ample to meet practically any demands for the mass production and prompt delivery of precision gears.

Finally, our engineers almost always manage to devise methods for the production of *special* gears, if the means for doing the job are technically feasible. Once your specifications are in our files, reorders are filled automatically.

For quality gears in quantity, made precisely to your specifications—and delivered on time—get our estimate on your requirements now!

YOU FURNISH THE SPECIFICATIONS • WE'LL PRODUCE THE GEARS

PERKINS Precision, Custom-Cut

PERKINS MACHINE & GEAR CO., Springfield 2, Mass.

GEARS

NEWS OF INDUSTRY

WAA Puts Final Touch On Direct-to-User Plan For Heating Furnaces

Washington

• • • Disappointed at slow sales and the lack of inquiries concerning the large number of heat treating furnaces, kilns and ovens dropped on its hands as war surplus, WAA is putting the finishing touches to a plan for carrying a sales campaign direct to the door of users of such equipment.

Officials say they have an estimated inventory approaching \$50 million worth of such equipment with another estimated \$15 to \$20 million yet to be declared.

This represents more than 14,000 different line items of the larger industrial types, exclusive of other thousands of bench portable and small pot types.

Almost every manufactured brand and type of annealing and heat treating furnaces and ovens may be found in WAA stocks. A major obstacle to disposal of such items is that neither probable buyers nor the surplus agency know what there was for sale elsewhere.

Hoping to remedy the matter WAA is preparing to send to regional offices descriptive forms in the nature of questionnaires which will not require special technical knowledge for filling in. These will be returned to the Washington office after inspectors have written in the information sought such as manufacturer brand, use, dimensions, type of heating or firing, and other required details.

Users of such items will be contacted through advertisements as well as by direct mail. Each potential customer will be asked to submit his specific requirements in this line, using somewhat similar forms or questionnaires which will be enclosed.

WAA will try to match the individual needs with items listed in its inventory; if it finds it has such items or equipment nearly approximating the requirements the manufacturer will be informed where it may be examined and purchased.

All sales will be on a fixed price basis although in special instances

the prospective buyer may be allowed to negotiate a bid.

Furnaces and ovens which were purchased by the government for special wartime purposes and which are not suitable for conversion to civilian use will be offered to the armed services for standby storage; if not wanted by the military, they will be scrapped.

Westinghouse Machine Tool Forum to Be Held Apr. 22-23 in Buffalo

Pittsburgh

••• The 1947 Westinghouse Machine Tool Electrification Forum will be held in the Hotel Statler, Buffalo, on Apr. 22 and 23. This will be the 11th annual forum sponsored by Westinghouse, the purpose of which is to give machine tool engineers and executives of the machine tool builders an opportunity to discuss electrical problems relative to the design and function of machine tools.

The first day of the forum will be headlined with a "Report from the Electrical Committee of the National Machine Tool Builders' Assn." E. J. Rivoira, electrical engineer, Cincinnati Milling Machine Co., Cincinnati, and chairman of this committee, will act as chairman of this part of the program. Another paper will be on "Electric Controls of Multi-Purpose Machines" by J. H. Mansfield, chief engineer of the Greenlee Brothers, Rockford, Ill. Supplementing this talk will be one by R. C. Heinmiller, electrical engineer for Foote Burt Co., Cleveland, on "Wiring of Station Type Drilling Machines." Westinghouse Motor Div. engineers will discuss totally enclosed nonventilated motors vs totally enclosed fan cooled motors; dc motor drive with Rectox or Selenium power supply; and cost comparisons of special versus standard ac motors.

The second day of the forum will be devoted to a tour of the Westinghouse Motor Div. plant—"The Home of the Life-Line Motor." T. C. Fockler, Motor Div. ac engineering manager, will tell about the production methods used and also why certain machines are used for given operations when he discusses "Precision Manufacture of Electric Motors" prior to this tour.


No. 3 in a series

SPRING SCENES by TORRINGTON...

showing how skilled springmakers using
Torrington Spring Coilers help industry make
better products... faster and cheaper.



Wire diameter .045 Spring lengths 7/16", 3/4"



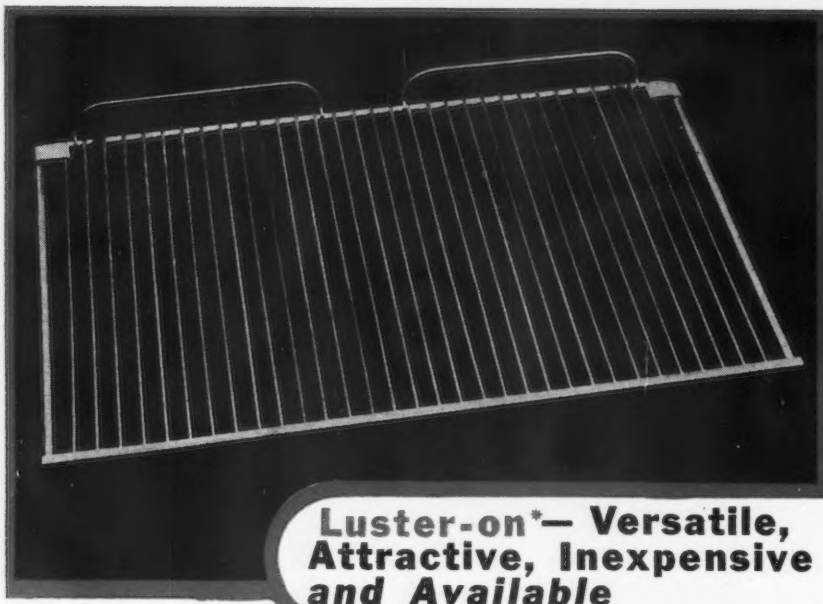
Wire diameter .045 Spring length 9/16"

For producing "tailor-made" springs a Torrington Spring Coiler operated by a professional spring maker permits the widest latitude in designing springs that can be turned out with accuracy at high speed. Send for catalog that describes Model W-11, on which the above springs were made, thirteen other models and their attachments. Wire diameters range between .003" and .750".



THE TORRINGTON

MANUFACTURING COMPANY
TORRINGTON, CONNECTICUT



Unretouched Photograph

Luster-on*— Versatile, Attractive, Inexpensive and Available

These refrigerator shelves, manufactured by the Canadian General Electric Company, are first zinc plated. Then they're Luster-on* Dipped before being coated with water dip lacquer. And the necessary handling that ordinarily leaves smudges and stains on zinc surfaces has no effect on these shelves once they've received a simple cold-dip in Luster-on*.

In addition to giving a more uniform and attractive finish than untreated zinc, Luster-on* provides a superior adhesive surface for

the final lacquering . . . protection against corrosion by making the zinc passive . . . and sparkling appearance that's sure to catch a customer's eye.

The Canadian General Electric Company is but one of many manufacturers that find Luster-on* on zinc inexpensive and easy to use in place of hard-to-get, high-priced tin or cadmium. Their approval of Luster-on* is your guarantee of its excellence. Available in two types—for manual or automatic use. Send coupon for full details.

16

THE Chemical CORPORATION
54 Waltham Ave., Springfield 9, Mass.

*Patent applied for

THE CHEMICAL CORPORATION
54 Waltham Ave., Springfield 9, Mass.

Please send me full particulars about Luster-on* bright dip for zinc surfaces. I am (am not) sending sample part for free dip. No obligation, of course.

Name _____

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The Iron Age

March 20

Strip Nickel faster and better with .. STRIPODE!

Speed-up the action of your regular sulphuric acid strip bath by adding Stripode. Salvage plating racks in less time with less acid. Stripode helps protect the base metal from pitting and roughening. Send for free sample. Start savings right away!

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54 Waltham Avenue, Springfield 9, Mass.
Please send me full information and free sample of STRIPODE for better nickel stripping.

Name.....

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15-5

THE CHEMICAL CORPORATION
54 Waltham Ave., Springfield 9, Massachusetts

Mid-American Exposition To Feature Metalworking Industry at Cleveland

Cleveland

• • • The 1947 Mid-America Exposition, which will be held in the Public Auditorium here May 22-31, will provide a cross-section of trade interest in the metalworking industry, which is planning to take the major share of the exhibit space in the show.

Directing the Exposition, which is expected to draw more than 200,000 people, are the following executives, committees and underwriters:

A. W. Steudel, president, Sherwin-Williams Co., is president of the 1947 show; the three vice-presidents are Charles J. Stillwell, president, Warner & Swasey Co., H. P. Ladds, president, National Screw & Mfg. Co., and C. T. Burg, vice-president, Iron Fireman Co.

On the executive committee are included: Norris J. Clarke, senior vice-president, Republic Steel Corp.; Frederick C. Crawford, president, Thompson Products Co.; George H. Codrington, general manager, Cleveland Diesel Div., General Motors Corp.; Clifford F. Hood, president, American Steel & Wire Co.; James L. Myers, executive vice-president, Cleveland Graphite Bronze Co., and A. J. Weatherhead, Jr., president, the Weatherhead Co.

Among the companies in the metal field which have already taken space for their exhibits in the 1947 show are: Abar Mfg. Co.; Republic Steel Corp.; Iron Fireman Co.; P. A. Geier Co.; Harry Ferguson, Inc., (Detroit and Cleveland); National Screw & Mfg. Co.; Avery Engineering Co.; Hayes Industries; Eaton Mfg. Co., and Federal Truck Co.

Underwriters include the corporations represented on the list of officers and executive committee; the Champion Rivet Co.; Cleveland-Cliffs Iron Co.; Cleveland Worm & Gear Co.; Forest City Foundries Co.; Fulton Foundry & Machine Co.; M. A. Hanna Co.; Lamson & Sessions Co.; National Malleable & Steel Castings Co.; Pickands, Mather & Co.; Steel Improvement & Forge Co.; Tinnerman Products Co.; Warner & Swasey Co.; and Wellman Engineering Co.

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**Make Copperweld Steel Your
Source of Supply *for***

QUALITY ELECTRIC FURNACE STEELS



**ARISTOLOY
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*Aristoloy
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Predicts Peak Business, Employment in Detroit Will Last Through '47

Detroit

• • • A continuation of prosperous business in Detroit during the remainder of 1947 and an anticipated employment level of 457,000 workers, 15 pct above 1941 the highest prewar year, has been predicted by John R. Stewart, of the research department of the Detroit Board of Commerce.

Observing that the demand for new automobiles and automotive parts and accessories is far in excess of the industry's ability to produce and that retail sales in the Detroit area are higher than usual for this season of the year, Mr. Stewart anticipates better than satisfactory industrial activity and employment for the next 10 months.

He declared that lack of steel will probably be the industry's limiting factor in 1947, but felt enough steel will be available to assure an output of 5 million pas-

senger cars and trucks during 1947.

"This figure would exceed by 53 pct the output of 1946 when strike-induced shortages of parts and materials limited volume to 3,265,000 units," he said. Nonautomotive manufacturing in the Detroit area, according to Mr. Stewart, is largely metalworking and activity in this field should be as high or higher than it was last year.

Detroit's public utilities have announced expansion programs calling for the expenditure of \$184 million in the Detroit area over the next 5 years. Detroit Edison's program calls for an investment of \$20 million in 1947 with an additional \$76 million by 1950. Michigan Consolidated Gas will spend \$28 million in the next 5 years.

Michigan Bell Telephone Co. has projected \$120 million in postwar projects, half of them in the Detroit area. Postwar plans in the City of Detroit involve an expenditure of \$100 million in the next 6 years.

Nonresidential projects for the

Detroit area aggregate \$300 million. This does not include the utility expansion previously described.

A vast expansion of Detroit's chemical industry is said to be under way. Residential building operations in excess of any year since the mid '20s are anticipated for 1947, Stewart said.

Buyer and Seller Both Lose on Small Orders, NICB Analysis Shows

New York

• • • The purchaser, as well as the seller, stands to lose when goods are ordered in small shipments, says an analysis of industry's small order problem which has just been released by the National Industrial Conference Board. Many of the more than 100 companies cooperating in the survey reported that the fixed costs of ordering, receiving, checking, placing in stock, making payment and doing the necessary bookkeeping and clerical work, raise the cost to the buyer out of all proportion to the value of the goods and usually result in a loss for the vendor.

Just prior to the war, orders for less than \$5 constituted between 35 pct and 53 pct of the total number of transactions handled by electrical wholesalers. It is estimated that this represented only 2 to 3 pct of the total sales volume and 3 to 4 pct of the total gross margin of these concerns. "The real significance of this situation," the study states, "appears from the fact that the average size of orders under \$5 is actually around \$3, upon which, at 25 pct, the gross margin is only 75¢. Since the average expense per order is estimated to be three to four dollars, and at least a dollar and a half on small cash sale, the effect on profits of a large volume of such small orders is not hard to gauge."

Another illustration of the seriousness of the problem is furnished by a manufacturer of a related line of industrial and consumer products who reported that the firm had recently made an analysis of its two major lines. It was found that approximately 30 pct of the number of orders

Renfroe Eccentric Cam Shackle Clamps

Made in All Capacities

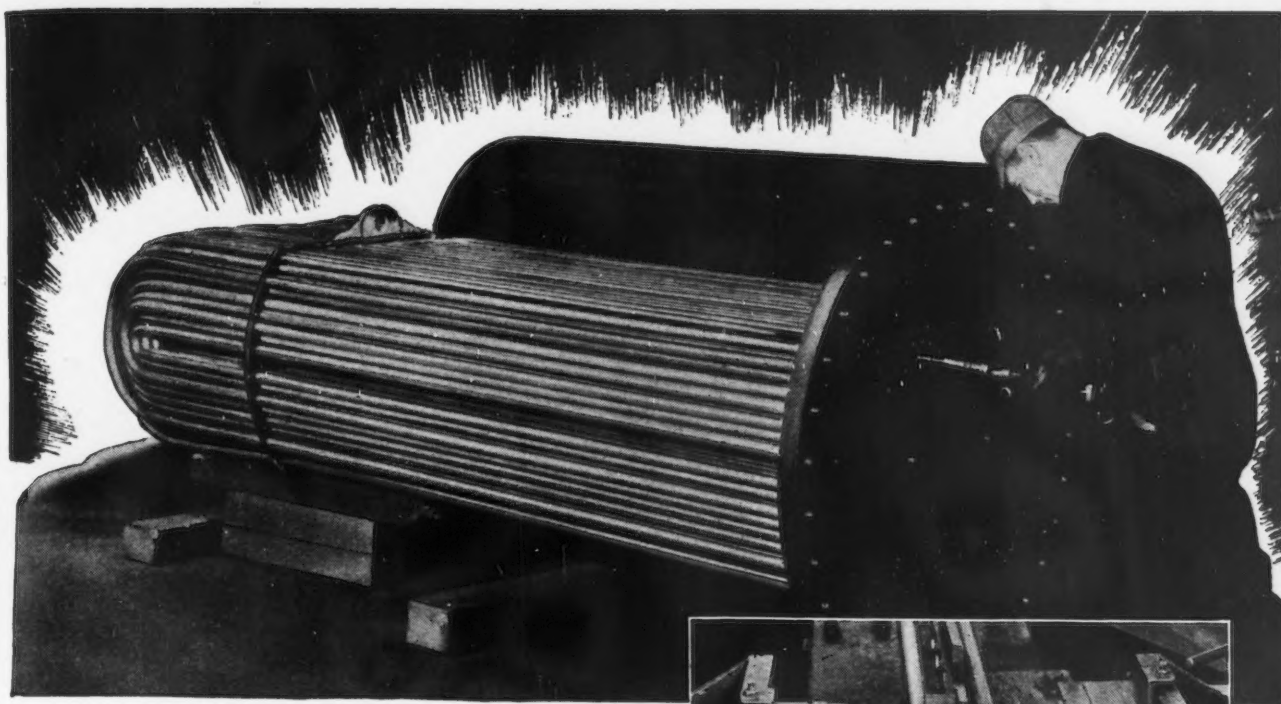


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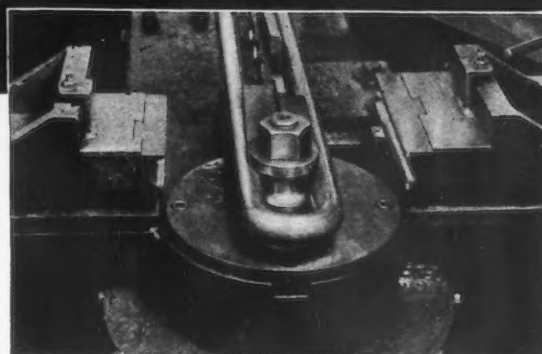
J. C. RENFROE & SONS

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**they bend
this stainless tube
with flowers**



Note the unusually tight return bends in this heating coil unit. The tubes are tough, corrosion resistant stainless steel, yet the inside bend is only $1\frac{1}{2}$ " mean radius—on a $1\frac{1}{4}$ " O.D. x 16 ga. tube!

It wasn't done without difficulty. The tube is bent on an automatic machine with ball-type mandrel. Trouble was, the ball, after only a few bends, picked up a heavy burr. Then, on a tight return, the tubes would invariably chatter, sometimes break. Worse yet, constant redressing of the ball reduced its size—on larger bends, the extra clearance made tubes wrinkle.

Production was at a standstill, until a Frasse engineer noticed that the mandrel lubricant was being forced out by the extreme pressure. From a nearby drugstore, he took "flowers" of sulphur, mixed it with

auto grease in proportion, and thinned the mixture* down with machine oil to the consistency of soft butter. This was rubbed well into the mandrel surface, then applied as a heavy coating. Tubes were bent to all radii without further trouble.

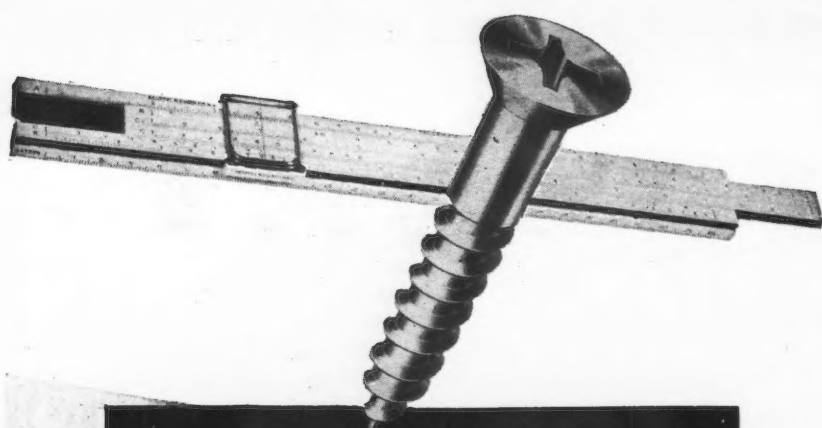
Frasse, with its wide range of shapes, grades and sizes, is an excellent source for your stainless steel. More than that, Frasse knows how to help you in stainless applications. Call us. *Peter A. Frasse and Co., Inc.*, 17 Grand Street, New York 13, N. Y. (Walker 5-2200) • 3911 Wissabickon Avenue, Philadelphia 29, Pa. (Radcliff 5-7100) • 50 Exchange Street, Buffalo 3, N. Y. (Washington 2000) • 157 Richmond Avenue, Syracuse 4, N. Y. (Syracuse 6-2103) Jersey City • Hartford • Rochester • Baltimore

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*Details for mixing this lubricant furnished on request. Write us.



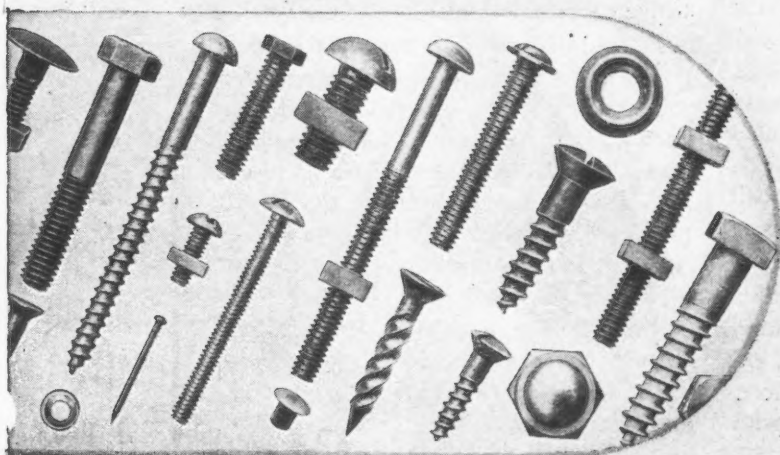
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Aided by special research in extensive chemical and metallurgical laboratories, our engineers are constantly improving methods, equipment and products to provide users with the most rugged, uniform and accurate fastenings science can devise.

HOLTITE *Engineered Fastenings* effect tighter, stronger, vibration-defying assemblies with cost-cutting efficiency. Select your next requirements from HOLTITE'S complete line . . . your time study records will prove the wisdom of their continued use.



CONTINENTAL

SCREW CO.

New Bedford,
Mass., U.S.A.

received represented less than 3 pct of the company's dollar volume of sales. "Although this does not mean," the survey notes, "that 30 pct of selling, warehousing, shipping, billing, collection and other expenses were attributable to 3 pct of the company's sales, it does indicate that a disproportionate share most certainly was."

Aside from the war-born varieties, the survey lists six common type of small orders. These are the repair part, oversight or "fill-in" orders, orders resulting from disorganized buying, "nature of the business" small orders, drop shipments, and the small account.

The survey outlines several solutions to the small order problem employed by companies cooperating in the survey. These solutions include reducing costs of filling small orders, passing on part or all of the higher costs to the customer, encouraging increases in the size of orders, discouraging small orders, or refusing entirely to accept orders below a certain specified minimum.

Retention of customer goodwill is cited by the cooperating companies as the primary reason which prevents them from either refusing to handle small orders or attempting to compensate themselves in full for the added cost in filling them.

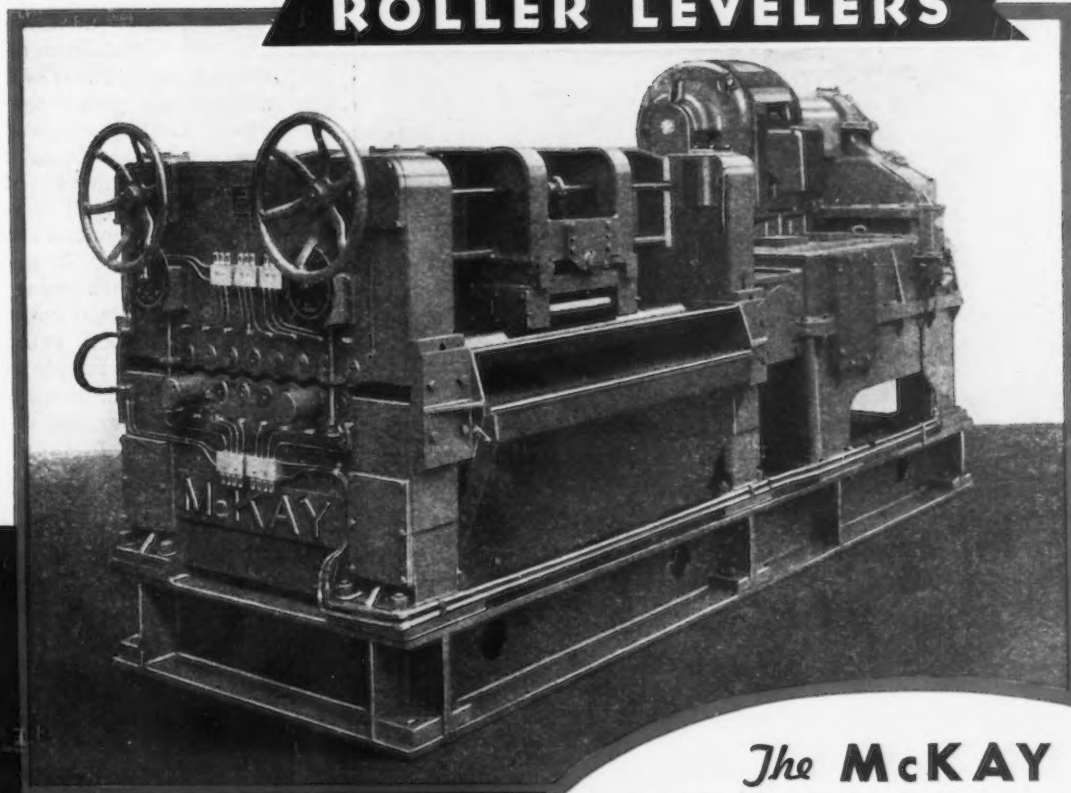
Among the manufacturers of equipment, both heavy and light, the majority of small orders arise from customer's needs for replacement parts. Although the fulfillment of these orders, even at a loss, is also the result of a desire to retain the goodwill of customers, the need is far more urgent than in those cases where small orders are filled merely as an accommodation. In the latter case, the customer can usually have his needs satisfied elsewhere. In the case of replacement parts, it may be extremely difficult or impossible for the customer to get proper parts elsewhere.

The need for remaining competitive has limited many companies in their efforts to cure their small-order problem. It is difficult, cooperating companies state, for a single company to institute and carry through a plan when the rest of the industry, or a substantial part of it, does not follow suit.

MCKAY

BACKED-UP

ROLLER LEVELERS



FEATURES

Compact design reduces required floor space.

All adjustments are readily accessible to the operator.

Accurate indicating dials are provided for the screwdowns.

Alloy steel Helical gears are used throughout—fully enclosed and running in oil.

Drive is through Universal couplings.

One-shot lubrication system.

Rugged construction insures continuous performance and low maintenance cost.

The **McKAY**

Backed-Up Roller Leveling Machine has extraordinary rigidity because its small diameter work rolls are supported by backing-up rolls. This type of leveling works the sheet more thoroughly.

Sheets processed on this type of leveler are strain-relieved to a greater extent and have far superior stamping and drawing qualities than those processed by the ordinary leveler.

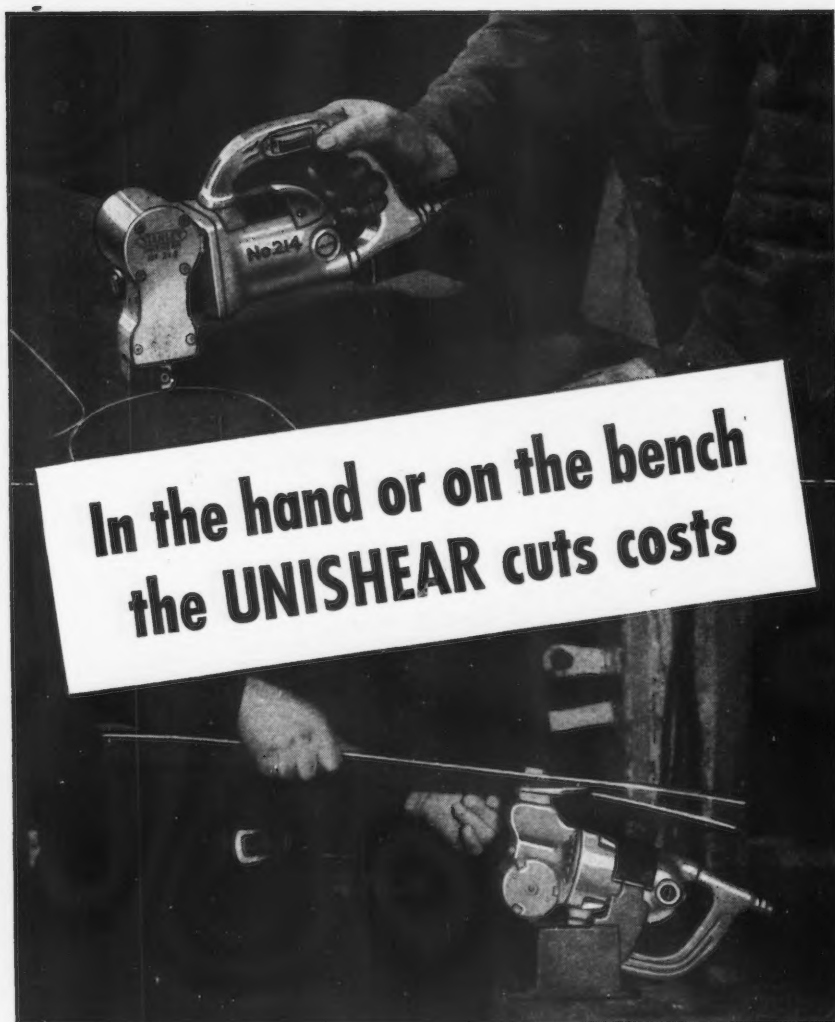
The **McKAY MACHINE** *Company*

ENGINEERS AND MANUFACTURERS OF SHEET, TIN, AND STRIP MILL EQUIPMENT

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ASSOCIATED COMPANY The WEAN ENGINEERING CO., Inc. • WARREN, OHIO

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STANLEY

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Senate Committee To List Subjects to Be Discussed at Hearings

Washington

• • • The Senate Committee on Small Business headed by Senator Wherry, R., Neb., soon will announce the specific subjects that it will go into. The House Committee on Small Business is just being re-established but it probably also will soon prepare its list of subjects on which public hearings will be held.

Steel, scrap, nonferrous metals, meat and food products generally may be included in the list of subjects to be discussed. Much depends on whether the Committee gets enough complaints of high prices and scarcities. While there are widespread public protests, the actual number of complaints from buyers now coming to the Committees has tapered off, apparently because small buyers do not think the Committees can do anything for them. It also has been suggested that some small buyers are afraid that complaints might result in their being shut off from sources of supply such as they are able to find. It was stated that small buyers do not have the established sources of supply such as larger purchasers have and that this is one reason for the claim that the small buyers have to pay much higher prices than their large competitors.

Hence, it is charged, the small buyer is not only being discriminated against, but is being priced out of the market. Whatever the merit of the charge may be it definitely reflects the belief of large groups in Congress, and is based on mail they receive from constituents as well as their own observations.

The difficulty of the whole situation is that Congress does not know what to do about it. While there is talk of reestablishing price controls, this reflects a decidedly minority view. It was pointed out that price control in peacetime is unpopular and ineffective generally because fixed ceilings cut down or shut off supplies. Low prices without supplies except those that find their way into the black market at high prices, it was pointed out, are of no use to the public at large. Buyers' strikes may occasionally

SAFETY



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one of the reasons why
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When you own Elwell-Parkers, the *maximum protection* they provide is a great source of satisfaction. Elwell-Parker users appreciate these features:

POSITIVE "ON-OFF" CONTROL—Truck cannot move unless operator stands on *both* pedals. Likewise it stops when he steps off the pedals, because brakes are applied and power is shut off.

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SAFETY CONTROL—Drive controller turns to "off" the moment operator releases handle. Limit switches and electric brakes automatically control, and overload slip clutches protect the other motors.

EASY HANDLING—By reducing operator fatigue, insures careful driving. Operators are always alert because Elwell-Parker Trucks have cushioned pedals, easy steering, controlled speed and smooth, quiet operation.

SUPER STRENGTH—Elwell-Parker Trucks are "tank-tough" in both fabrication and materials. This strength is another assurance of safety in operation.

LESS FIRE HAZARD—All trucks carry Underwriters' Laboratories' UL Seal. Elwell-Parker built Class B motors have more costly glass and asbestos insulation.

Yes, Elwell-Parker advanced design and construction enable you to *forget* truck safety problems. For proper application of these trucks to your specific needs call in the nearest E-P man. The Elwell-Parker Electric Co., 4225 St. Clair Ave., Cleveland 14, O.

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*unmatched experience
 in materials handling.*

ELWELL-PARKER
POWER INDUSTRIAL TRUCKS

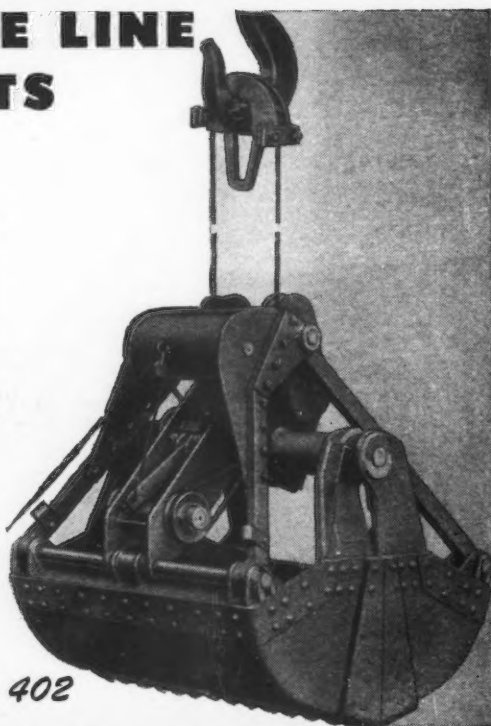
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ILLUSTRATED is the hook-on type, for intermittent service. It is reeved and ready for operation on overhead traveling crane, monorail hoist, locomotive crane, derrick, ships tackle or any other hoisting device which has but a single hoisting drum available for bucket duty. Just slip the yoke over the crane hook.

Erie Single Line buckets are also available in the direct-reeved type for permanent installation. Describe your Single Line bucket need — we'll give you our recommendations for we build all types and sizes.

● Write for Booklet 402



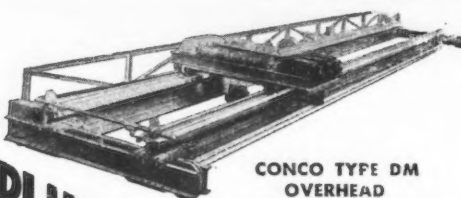
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BUCKETS • AGGREGATORS • PORTABLE CONCRETE PLANTS

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CONCO ENGINEERING WORKS, 15 Grove St., MENDOTA, ILL.

NEWS OF INDUSTRY

bring down prices, it was added, but as a whole they are not effective.

The real answer, it is realized, is uninterrupted and increased production but the immediate problem is to ease the present swift inflationary trend of prices until production catches up with demand. Once that is achieved, it is widely accepted that as a matter of course prices will have to come down but probably not to the prewar levels when costs, such as wages, were much less than they are today.

Whatever may happen in the period of downward readjustment there certainly is no expectation that wages will return to prewar levels. It is commonly accepted that wages should remain high without going beyond reasonable limits.

WAA to Launch New Program to Expedite Disposal of Surplus

Washington

... WAA has announced a new and continuous program to expedite the disposal of surplus government-owned parts for construction, farm, mining and some industrial machinery and equipment and their attachments is ready to be launched. Complete inventories of all categories and types are not yet available, WAA said, but it is estimated that the total acquisition cost to the government of these surpluses may reach as high as \$75 million.

For the first time since surplus machinery parts have been sold, they will be offered on a sealed bid basis and offered concurrently to all priority and nonpriority groups. This will be a continuing program and priority groups and other eligible buyers will be notified and invited to bid on the offerings.

The offering will be made concurrently to priority and nonpriority buyers. Nonpriority buyers will include dealers and manufacturers of construction, farm, mining and industrial machinery and equipment and their attachments; industrial users; marine suppliers; exporters; steel mills, and buyers of scrap metal. Each lot of parts offered will not exceed \$25,000 (original cost to the government). However, the lot can

No. 4 AJAX-HOGUE Wire Drawer

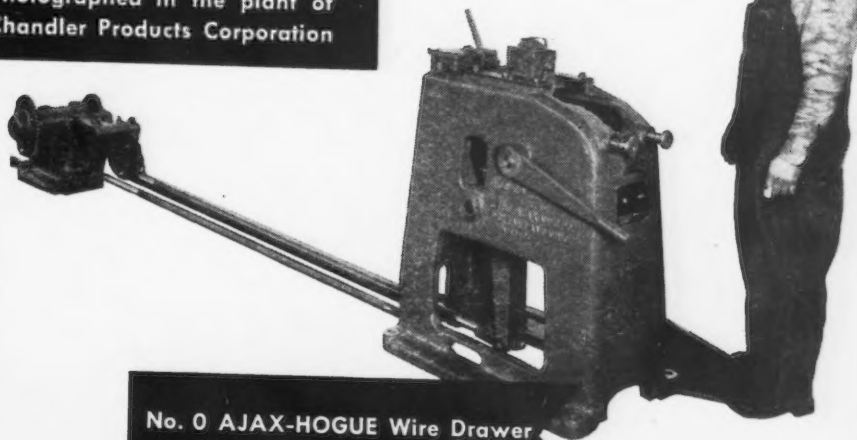


★Can be attached to any make and type of Cold Header—driven from the crankshaft.

A LOWER YIELD POINT FOR HIGHER QUALITY THROUGH AJAX-HOGUE WIRE DRAWERS

●Cold heading, at a high rate of production, to close tolerance at reduced cost is achieved by using AJAX-HOGUE wire drawers driven directly by cold headers. Freshly drawn and coated wire has a lower yield point as it is fed to the header dies. This low yield point of the wire allows the metal to flow more freely, filling out the die impressions to a high degree of accuracy and uniformity. And the wire is given a clean coating free from foreign matter so often encountered in the use of wire not freshly drawn. AJAX-HOGUE wire drawers are built in five sizes with capacity from $\frac{1}{4}$ inch to $\frac{3}{4}$ inch diameter . . . Write for Bulletin No. 111.

Photographed in the plant of Chandler Products Corporation



No. 0 AJAX-HOGUE Wire Drawer

THE AJAX

MANUFACTURING COMPANY

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110 S. DEARBORN ST.

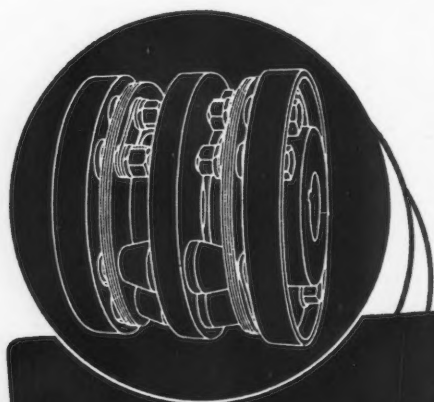
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THOMAS

Flexible COUPLINGS

are specified by engineers wherever
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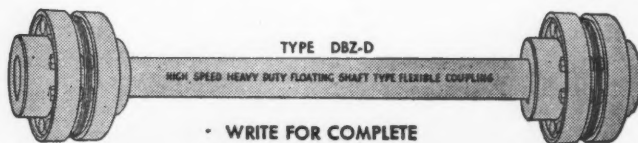
THOMAS
Flexible COUPLINGS

provide for
Angular and Parallel
Misalignment as well
as Free End Float...

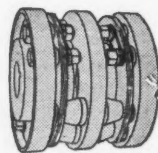
and Eliminate
**BACKLASH, FRICTION,
WEAR and CROSS-PULL**

NO LUBRICATION IS REQUIRED!

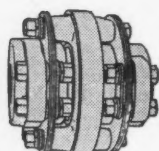
The Thomas All-Metal Coupling
does not depend on springs, gears,
rubber or grids to drive. All power
is transmitted by direct pull.



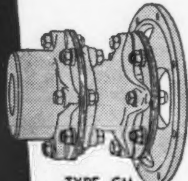
• WRITE FOR COMPLETE
ENGINEERING CATALOG



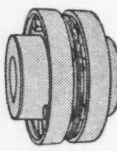
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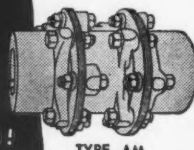
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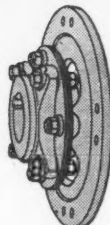
TYPE CM



TYPE ST



TYPE AM



TYPE SS

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA

NEWS OF INDUSTRY

be offered in amounts small enough to interest small buyers.

The regional office will establish a reserve to be used to fill the needs of priority purchasers. The only exception to this procedure is for the over-riding priority holders, who have a certificate of urgency or a directive as established under Housing Expediter PR-4. Certified buyers can obtain surplus property, material and equipment needed for construction or production under the Veterans Emergency Housing Program.

Prices for the surplus parts sold to priority buyers will be established by the lowest acceptable bid offered by nonpriority purchasers.

Calls Conference For Discussion of Magnetic Particle Inspection

Chicago

... A conference called for the purpose of discussion of the use of magnetic particle inspection in the welding field is to be held at the Congress Hotel on May 8 and 9, in Chicago. It is planned to conduct the meetings on the basis of an open forum, with discussion leaders selected from the various fields, in which this inspection method has found useful application.

Fluorescent penetrant inspection as applied to the inspection of welds in non-magnetic material will also be given a place on the program. The conference will be held under the sponsorship of the Magnaflux Corp. Those interested in attending should write Mr. W. E. Thomas, of that company, at Chicago.

An outline of the program follows:

Thursday, May 8

Morning Session — 9:30-12:45

Presentation of the fundamental consideration, both theoretical and practical, involved in the application of magnetic particle inspection to welding.....Magnaflux Corporation Staff.

Afternoon Session — 2:15-3:30

Relation of magnetic particle to other methods used in the inspection of welds.... Discussion Leader to be Announced.

Afternoon Session — 3:30-5:00

Open discussion of subject matter presented during the day, with panel consisting of the day's speakers.

Friday, May 9

Morning Session — 9:30-12:45

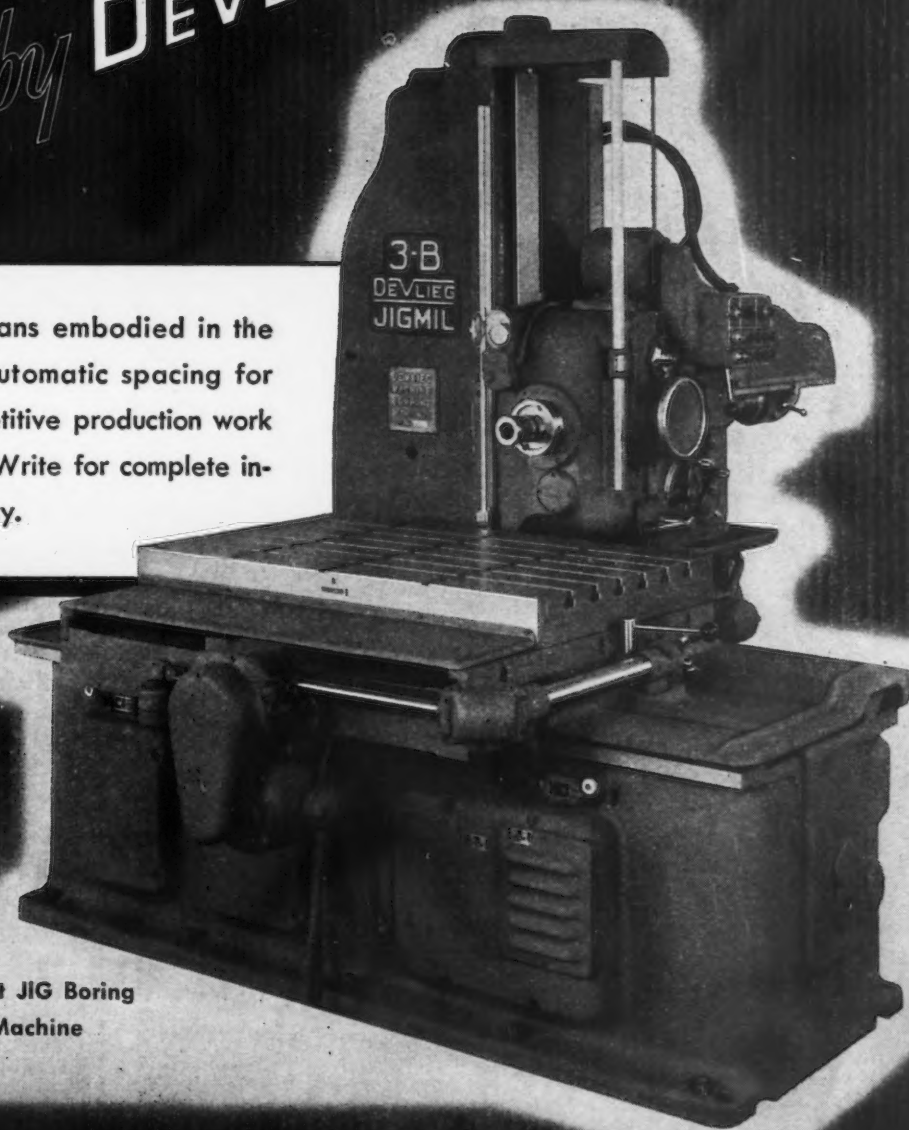
Open forum discussion of magnetic particle

Announcing

DUPLITROL

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● A new means embodied in the JIGMIL for automatic spacing for duplicate repetitive production work without JIGS. Write for complete information today.

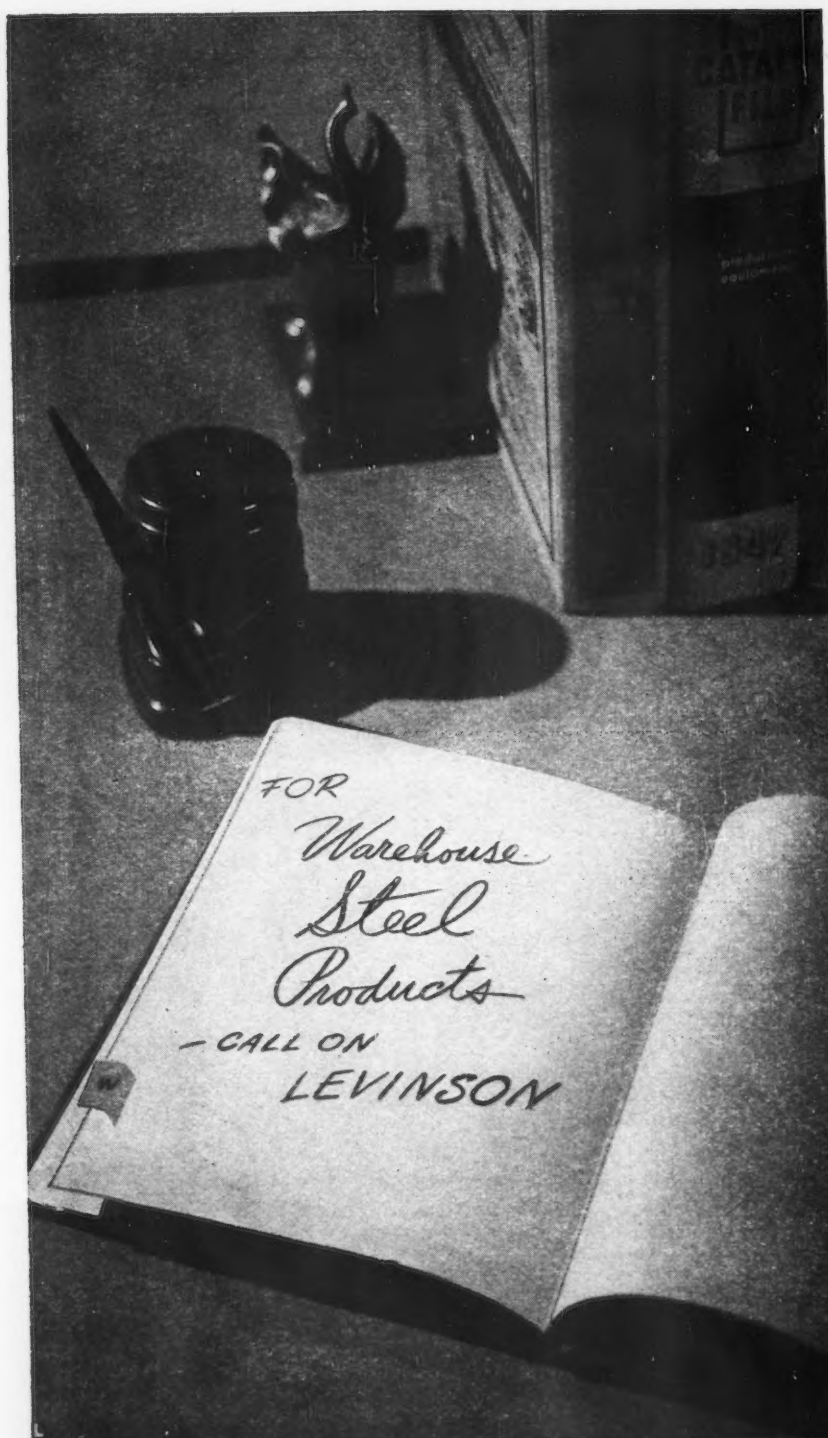


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NEWS OF INDUSTRY

inspection problems in various specific fields, with a panel composed of a discussion leader for each field....Names of Leaders to be Announced.

Afternoon Session — 2:15-3:15

General discussion, with same panel as Morning Session.

Afternoon Session — 3:30-4:00

Fluorescent Penetrant Inspection — what it is, how it works.....Magnaflux Corporation Staff.

Afternoon Session — 4:00-5:00

General discussion of application of the Fluorescent Penetrant Method to the inspection of welds.....Discussion Leader to be Announced.

Saturday, May 10

Visit to Magnaflux Corporation Plant for those interested — demonstration of equipment and methods.

Steel Fence Posts Sold

Cleveland

• • • Sale of nearly 600,000 unused steel fence posts that were until recently slated to be scrapped for \$53,000 finally brought the Cleveland War Assets Administration \$68,000, the Cleveland regional office announced recently.

After two offerings failed to produce a buyer for the cork-screw-type, ungalvanized posts, they were tentatively programmed for a scrap offering. Meantime, the products research branch, whose business it is to find a market for apparently unusable items, found a customer who contracted for the entire lot at about 11¢ each.

Standard Bureau Issues

A New Study on Chains

Washington

• • • Sponsored by the Chain Institute, Inc., the Bureau of Standards has promulgated a simplified practice recommendation which has been identified as R-100-47, welded chain.

The recommendation contains 35 tables of sizes and finishes of that many kinds and types of welded chain of industrial, harness and agricultural purposes.

Printed copies are now available and may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. at 10¢ each. A discount of 25 pct will be granted on orders of 100 or more copies.

Plans to Release All Unsold, Unleased War Facilities in Michigan

Detroit

• • • A campaign to release all unsold and unleased war plants in Michigan to civilian users has been announced by R. F. Haggerty, newly appointed regional director for War Assets Administration. Mr. Haggerty has also announced the freezing of machine tools in Detroit's two largest WAA warehouses so that an inventory can be taken.

WAA plans to advertise for bids on 22 plants located in a dozen communities in Michigan. A deadline of May 3 for sale or lease of these plants has been set.

According to John A. Dodds, directing the real property disposal, VJ-Day left Michigan with approximately \$1 billion in surplus plants and goods. Of these, 42 plants were sold during 1946 with a cash return to the government of \$20,670,000. Leasing of 14 other plants, including Willow Run, brings WAA \$1,313,307 per year.

Largest plants to be disposed of are three operated during the war by the Dow Chemical Co. for production of magnesium and castings, which represent an original outlay of \$41,084,000.

There are more than \$39 million worth of buildings at the Ford Motor Co. Rouge plant for sale.

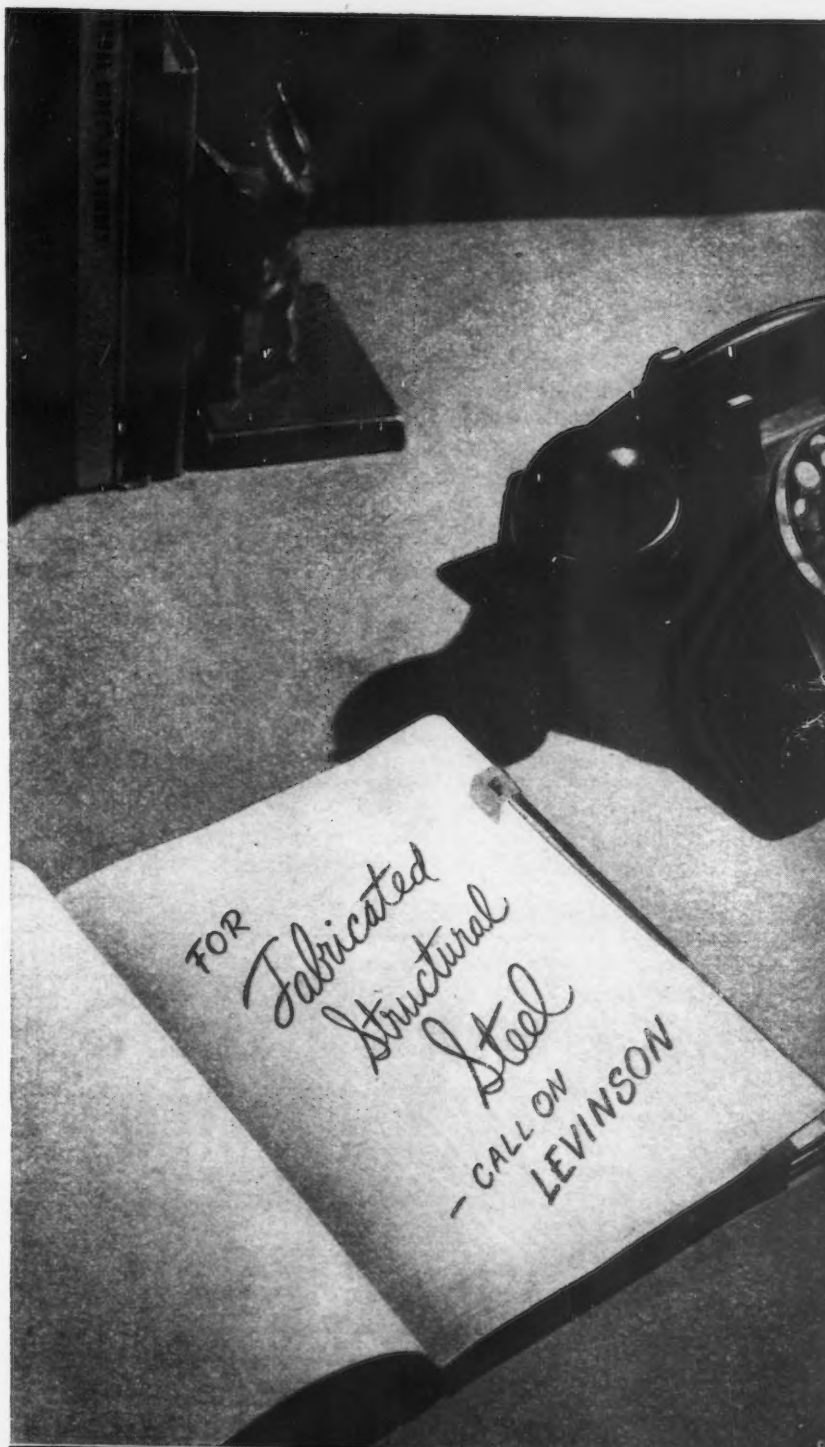
The machine tool inventory which starts this week involves \$250 million worth of, surplus equipment stored in the WAA's two largest warehouses, at River Rouge and in Highland Park.

Ends 3 Years Without A Serious Accident

Pittsburgh

• • • The Clairton, Pa., Works of U. S. Steel's Carnegie-Illinois Steel Corp., has completed its third full year of operations without loss of life, limb, or eye to any of its employees.

In round figures, this announcement means that the men and women of Clairton Works have completed over 40,000,000 manhours of work without a single serious accident capable of permanently



The
LEVINSON
STEEL COMPANY
PITTSBURGH, PA.

**ALL TYPES OF STRUCTURAL AND
MISCELLANEOUS STEEL FABRICATION**

disabling an employee being recorded.

Clairton's facilities, which extend 4½ miles along the Monongahela River, include the world's largest byproducts coke plant, an integrated steel mill and a river transport system which operates marine ways, a fleet of steamboats and barges.

The story behind this 3-year record is revealed in Clairton's highly developed safety program. Beginning with the general superintendent, H. W. Seyler, and continuing all the way through the organization, safety is planned into every operation. Such planning was evident recently in the rebuilding of a Clairton blast furnace. Every step was diagrammed in advance and "must" safety precautions were drawn into each diagram. The job was accomplished without a single mishap. Similar safety planning accompanied the accident-free moving of three 150-ft smoke stacks in the byproducts plant.

Blaw-Knox Net Income Is \$2.49 a Share in 1946

Pittsburgh

• • • Blaw-Knox Co. reports total income for 1946 of \$3,352,071, equivalent to \$2.49 per share on common stock outstanding at year-end. This compares with earnings for the preceding year of \$3,344,288, or \$2.51 per share.

The total income for the year consisted of \$1,028,230, or \$0.76 per share, from operations and \$2,323,841, or \$1.73 per share, from nonrecurring charges and credits, the principal item of which was \$1,871,238 transferred from reserve for war and post-war adjustments created in prior years.

Net sales for 1946 amounted to \$46,068,338, which, after elimination of nonrecurring war business, was substantially in excess of the volume for prior peacetime years.

In releasing the earnings statement, William P. Witherow, president, said that 1947 began with

a backlog of \$31,500,000. "Present unfilled orders and the current demand," Mr. Witherow said, "should allow a satisfactory operation in 1947 if production is permitted to proceed without interruption and if a greater quantity of raw materials can be obtained."

National Malleable Net Is \$2.09 a Share

Cleveland

• • • National Malleable & Steel Castings Co. has reported net profit of \$992,770 on sales of \$29,824,800 for 1946, after taxes of \$1,050,000. This equals \$2.09 a share on 474,861 common shares outstanding. In the preceding year sales were \$34,206,540 and the profit from operations was \$10,640.

A \$2,400,000 program is under way to modernize the Indianapolis plant and the company has purchased \$375,000 of equipment installed by the government at the Cicero plant in Chicago. An appropriation of \$325,000 has been approved for equipment at Sharon to manufacture automotive crankshafts, which the company has never made before.

Sales in 1946 were the largest for any peacetime year since 1920, President Cleve H. Pomeroy informed shareholders in his annual report. The 3.33 pct of profit on sales was lower than in most years in the past and lower than may be expected in normal years in the future, he said. Mr. Pomeroy ascribed this to the difficulties in 1946 of maintaining steady operations because of stoppages at the plants of large customers and consequent frequent revisions of schedules.

American Stove Reports

St. Louis

• • • American Stove Co. reports its 1946 sales were \$20,649,163, the largest peacetime volume since the company's incorporation in 1901, compared with \$26,868,805 in 1945. Net profit amounted to \$1,185,567, equal to \$1.20 a share of common after all charges and taxes against \$658,933, equal to \$1.22 a share in 1945.

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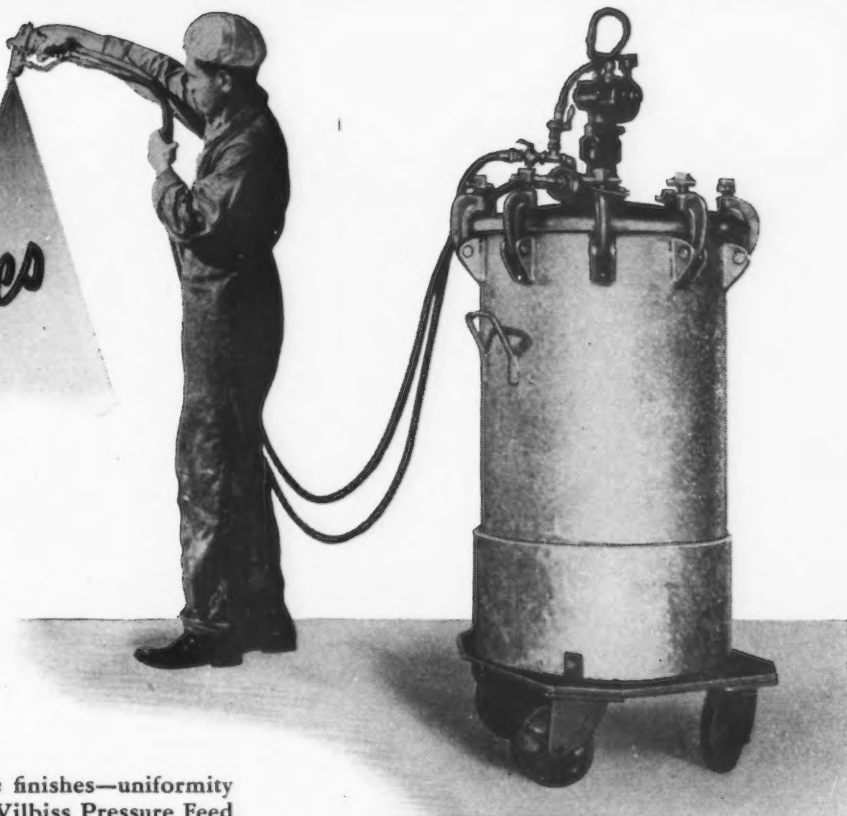


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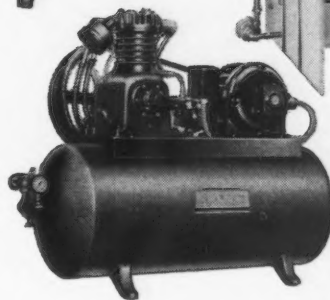
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CPA Reports A Bright 1947 Industrial Outlook

(CONTINUED FROM PAGE 127)

for plant and equipment will continue at least for the next 6 months.

The year's output of consumer durable goods is expected to exceed that of 1940-41, highest in history. Leading increases will be in mechanical refrigerators and electric irons, with washing machines close behind.

Nearly 2 million more passenger automobiles and trucks than the 3,090,000 turned out in 1946 are expected to reach 5 million buyers during 1947.

A 50 pct dollar increase in public and private new construction, to a total of about \$15 billion for the year, is regarded as feasible. OTC officials estimate that this will mean an expansion in physical volume, including highway, sewers, water-works, railroads, etc., of about one-third over that put in place in 1946. Private residential building is expected to ac-

count for some \$6 billion, as against \$3.3 billion last year. With maintenance and repair, total construction may reach \$20 to \$22 billion.

Supplies of building materials should show wide improvement, and production in general will support the increased construction activity forecast, the report indicates.

Present outlook is for a total steel product supply in 1947 of at least 61 million tons, 18 pct more than in 1946.

Copper supplies in the neighborhood of 1.9 million short tons will be considerably below probable 1947 demand.

Continuing shortages in tin, lead and aluminum are looked for.

Although representatives of the steelmaking and freight car building industries, at the instance of CPA, have joined in a program to turn out 7000 cars a month, American railroads will continue to face a shortage of freight cars during 1947, the report indicates.

In analyzing the general busi-

ness outlook, the CPA economists who prepared the report point out two possible alternative patterns for 1947. The first is maintenance of current high levels of production and employment. The second would be marked by some decline in production, prices and employment in the second half of 1947, which would continue into 1948.

Largely because of belief in the probability of stabilized labor-management relationships, "along the lines recently demonstrated in the steel, automobile and building industries," analyses of the outlook for specific industries contained in the report generally are more in accord with the first alternative than with the second.

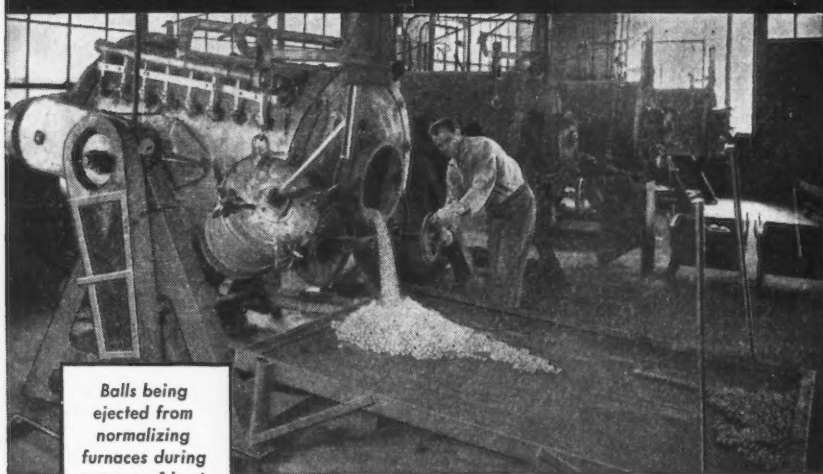
"The crucial question for 1947 is whether the readjustment in the price structure will come mainly through a decline in the prices of those commodities which have risen much more than average, or chiefly through a further rise in those prices that have lagged," the report says. "At the present time, the first alternative—which is also the more desirable course—appears the more likely one, with the possible exception of building materials."

Other highlights of the general business outlook section of the report follow:

Output and employment. If present tendencies continue, gross national product is expected to decline from the peak annual rate of about \$210 billion (not adjusted for price changes) in the first quarter of 1947, to a rate of somewhat less than \$200 billion in the fourth quarter. For the year as a whole, gross product would be about \$202 billion, \$10 billion above that of 1946. Employment in these conditions would show only small variations.

Producers durable equipment. Shortages of steel and component parts are expected to restrict production increases in physical terms to 25 to 30 pct above 1946. Such an increase, combined with price rises of 10 to 15 pct, would mean expenditures 40 to 50 pct in excess of last year's level. If, however, business activity should slow down at mid-year, a decline of about 10 pct within the first 6 months after the peak could be ex-

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NEWS OF INDUSTRY

pected. This would leave expenditures at a rate of \$14 billion in the fourth quarter of 1947, roughly 5 pct below the level of a year earlier.

Leading the 1946 review section of the CPA report is information that industrial activity in December declined for the first time since last May. Decline in the Federal Reserve Board's seasonally adjusted durable goods index, to 209 from 214 in November, was almost entirely due to the more than seasonal drop of 11 pct in iron and steel output which resulted from the soft coal strike.

Despite December set-backs, industrial production was maintained at high levels during recent months. Steel output was at 91 to 93 pct of capacity, with a peak of 93.1 in the final week of January. Automobile production was at a rate of about 95,000 passenger cars and trucks per week. Two and one-fifth million tons of bituminous coal were mined each working day and petroleum output was at the daily rate of 4.7 million barrels. In weeks not affected by holidays, electric power output during December and January was close to 5 billion kw hr, an all-time high.

Manufacturers' inventories increased a billion dollars, approximately 5 pct, during October and November, rising to \$19.9 billion. Preliminary estimates for December indicate a further rise to \$20.2 billion took place.

Passenger automobile production dropped from 286,000 in October to 261,000 in November, but rose to 262,000 in December. Truck production in December rose to 101,000 from the November figure of 100,000, but failed to equal the October peak of 110,000, largely because of the holidays.

Shortages of steel and iron probably will continue to curtail automotive output in 1947, although a high rate of production is expected. Some industry sources believe a total of 5 million passenger cars and trucks might be turned out this year, as against 3,090,000 in 1946. CPA considers it possible that the industry estimate may be exceeded, if present high rates of steel output continue. First quarter passenger car production, according to manufacturers, will be only 5 pct below the 1941 rate.



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Gallup Polls

(CONTINUED FROM PAGE 103)

top group—Henry A. Wallace, Herbert Hoover, and Harold E. Stassen—still receive very prominent mention in the poll this year.

For purposes of comparison, here are last year's top people:

- (1) Douglas MacArthur
- (2) Dwight D. Eisenhower
- (3) Harry S. Truman
- (4) Eleanor Roosevelt
- (5) Winston Churchill
- (6) Herbert Hoover
- (7) Henry Wallace
- (8) Thomas E. Dewey
- (9) Harold E. Stassen
- (10) James F. Byrnes

Among the men polled, the top five most admired persons are Eisenhower, MacArthur, Churchill, Marshall, and Truman.

The women's choices — MacArthur, Eisenhower, Truman, Eleanor Roosevelt, and Churchill.

Veterans pick Eisenhower, Marshall, MacArthur, Churchill, and Truman.

Names most prominently mentioned in the present poll, after

the top ten, include Elder Statesman Bernard M. Baruch, Henry A. Wallace, Premier Joseph Stalin, Mohandas K. Ghandi, Sen. Arthur Vandenberg, of Michigan; Walter Winchell, columnist; Henry Ford, Cordell Hull, Herbert Hoover, and Albert Einstein.

In addition to those already mentioned, the following persons received prominent mention throughout the country:

Military and Naval Leaders: Adm. William F. Halsey, Gen. Charles deGaulle, Adm. Richard E. Byrd, Gen. Mark W. Clark, Adm. Chester W. Nimitz.

Political: Clare Boothe Luce, Gov. Earl Warren of California, Harold E. Stassen, Sen. Robert A. Taft, Generalissimo Chiang Kai-shek, David E. Lilienthal, Fiorello H. LaGuardia, Anthony Eden, Sumner Welles, John G. Winant, Leon Blum, Sen. John W. Bricker, Sen. Tom Connally, Robert LaFollette, Jr., Field Marshal Jan Christian Smuts, Edward R. Stettinius, Jr.

Actors, Singers, Athletes: Clark

Gable, Kate Smith, Bob Hope, Bing Crosby, Babe Ruth, Hank Greenberg, Frank Sinatra, Joe Louis, Alec Templeton, Van Johnson, Paul Robeson.

Writers, Commentators: George Bernard Shaw, Helen Keller, Drew Pearson, Fulton Lewis, Jr.

Religious Leaders: Archbishop R. J. Cushing, Father Flanagan, E. Stanley Jones, Msgr. Fulton J. Sheen.

Scientists: Madame Marie Curie and Karl Compton.

Business Figures: John D. Rockefeller, Eric A. Johnston, "Eddie" Rickenbacker.

Labor: John L. Lewis.

Others: Charles A. Lindbergh, Madame Chiang Kai-shek, Duke of Windsor.

The London Economist

(CONTINUED FROM PAGE 109)

Court may be that of its own functions. The Court of 1933 appeared to have a large measure of unanimity with regard to the subject matter of New Deal legislation, and to act on that basis. Today's Court may have a comparable predilection for a roughly definable political position, but it appears to be divided on the appropriateness of acting on that basis.

The issue goes deep into political theory. During the New Deal years, a philosophy of law developed which might claim ancestry by the Yale Law School out of the Dept. of Justice. Its main thesis was that the law is what the judges say it is; their reference to precedent and the like is sanctimonious hokum which puts a dignified cover over what the judges think is appropriate substance. If this is true, then any judge consciously or subconsciously starts with what he regards as a good decision, and works up reasons to back that decision.

By adherents of this philosophy, the majority judges of the Supreme Court in the early New Deal years are taken as examples of subconscious judges, and the stigma of reactionary is likely also to be applied to contemporaries who do not believe that a justice's own opinion on the rights of a given case ought to enter into the opinion that is handed down in

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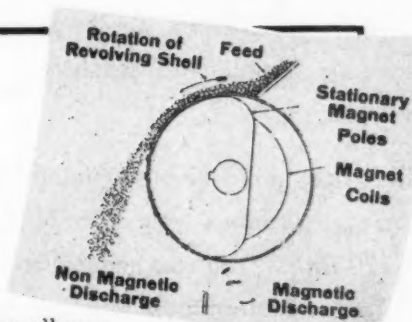
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NEWS OF INDUSTRY

some Monday morning's batch of decisions.

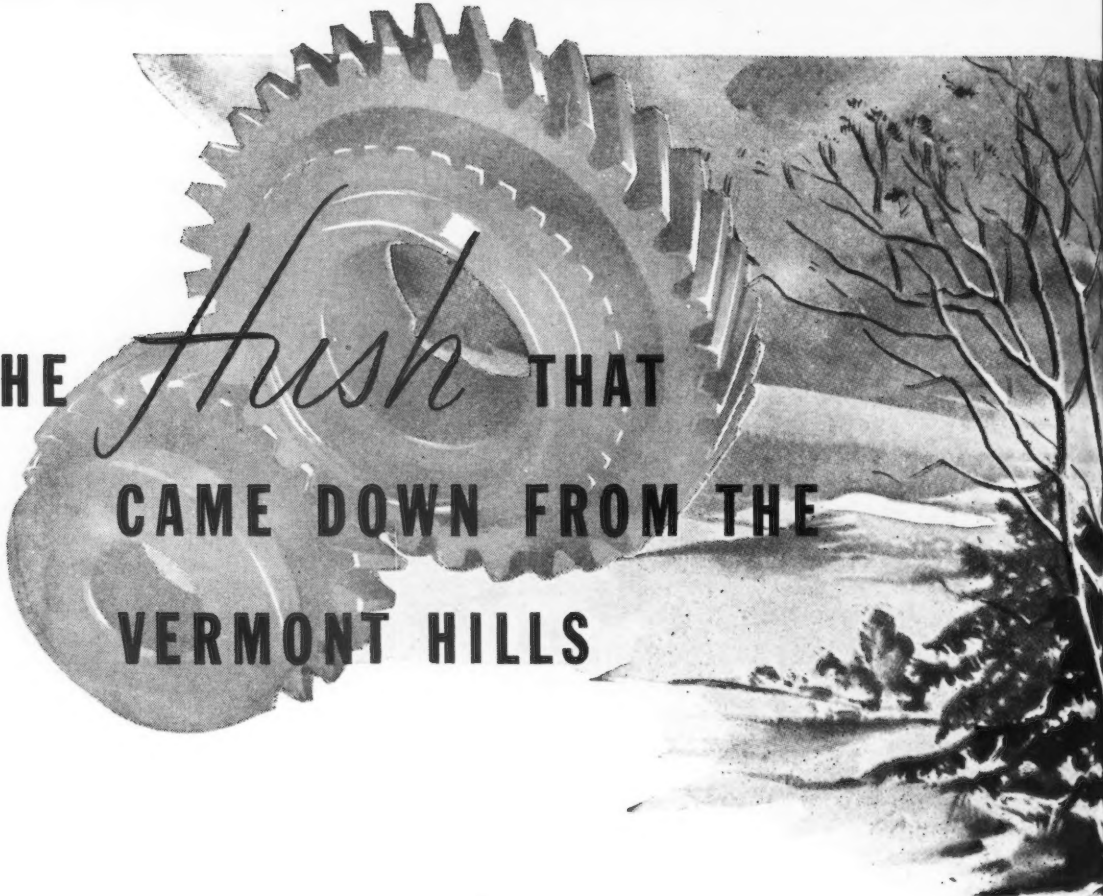
Ironically, the logic of this philosophy leads the New Dealers to approve of judicial decisions which represent the minority position in the country—which is exactly what the New Dealers accused the "Nine Old Men" of doing a decade ago.

The alternative view is less an argument regarding the likelihood of judges' views on the substance of statutes playing a part in their decisions as an argument in favor of courts recognizing the maximum breadth of legislative initiative.

According to this view, whether or not a law is a good law is not the Court's function to say; rather, it is whether or not the legislature making the law stayed within reasonable constitutional limits when passing it. Much of the personal feeling on the Court, as evidenced in the Jackson-Black outburst of last year, in the Frankfurter-Douglas difficulties, and in the appointment of Vinson, veteran composer of many executive agency feuds, as Chief Justice, stems from this divergence of philosophy.

The Democrats may therefore find that some appointees who were staunch supporters of New Deal substance before they became justices, now regard the subject matter of statutes as no longer their specialty. And some of those whose decisions have followed New Deal tendencies most regularly may be susceptible to the effects of the new climate in the country. This is a court of relatively young men, most of whom have had legislative and executive experience. Even more than the Courts in the days when Mr. Dooley wrote about them, they may have a predilection for the election returns.

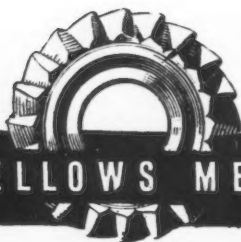
But with labor now turning to its old enemy, the Courts, in an effort to redress a legislative balance shifting against it, the third arm of government will over the next months be exercising its full share of power.



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